

# COAL AGE

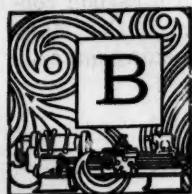
Volume 16

New York, July 3, 1919

Number 1

## Bolshevism—Not a Principle, But a Passion

BY R. DAWSON HALL



**B**OLSHEVISM is not a creed, it is a condition. It is a souring of the mind. The person that has it is a man diseased, a man whose judgment is warped by hatreds. The nearest evil akin to Bolshevism is Junkerism. The rich man who does not want to see the poor man thrive (and there are such men) is the analogue of the workingman who begrudges to the capitalist the profits of his good judgment and intelligence. The well-to-do employer who will never believe in the good intentions of the average workingman is the counterpart of the Bolshevik who proclaims all rich men robbers.

Put a Bolshevik in clover and forthwith he becomes a Junker. Bolshevism never was a principle with him but a passion; and like the dog, as soon as he gets the bone for which he has been barking he loses interest immediately in his loudly proclaimed principle of subdivision.

To judge by what they say, the Bolsheviks mistake all capitalists for Junkers; and Junkers believe all workingmen Bolsheviks or little better, though the great majority of the *haves* are not Junkers nor a large part of the *have nots* Bolsheviks.

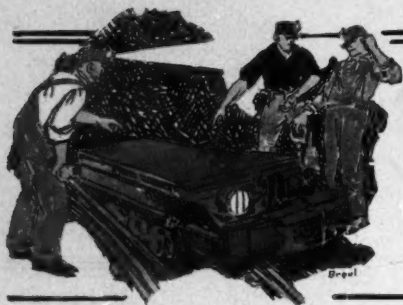
Our great need is to see matters sanely, to catch a glimpse of the essential healthiness of private and national life, to watch for and

note the many services that are rendered without pay or hope of advantage. Times without number within the compass of a single day every man is the recipient of favors for which he gives no requital and for which the giver expects nothing but thanks. Selfishness has its part in life, but with most men it is not the only motivating nor indeed the leading factor.

The mind of the Bolshevik and Junker is like the stomach of the dyspeptic. In that which delights the normal man he finds fermenting and distressing possibilities. No one need fear that the Bolshevik will rule if we suppress all attempts at revolution, for he is hopelessly in the minority and he knows it; and he will continue so to be. The only possibility is that he may stir up such a reaction in those he unjustly attacks that they may overestimate the importance of the Bolshevik and by inconsiderate action and thoughtless words estrange and anger the immensely more numerous men who are of more temperate mind.

It is certain that the United States democracy is not prepared to cast off the principle of compensating services by their worth, nor will it permit the man who contributes nothing to human welfare and boasts about the little he does to share equally with the man who, by constructive effort, adds to the product of the world and therefore to the well-being of all men.

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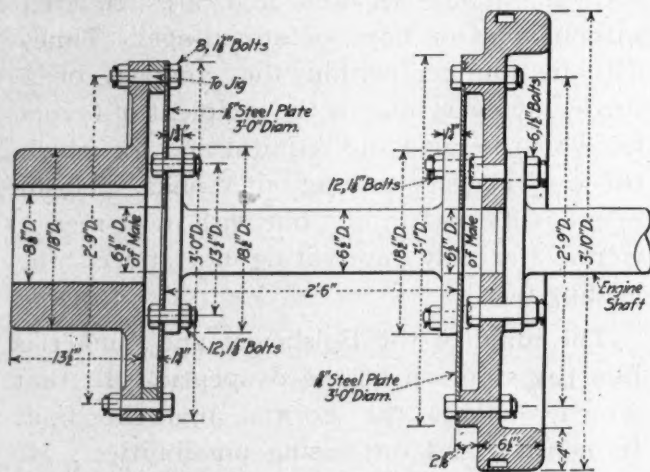


# IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

## Flexible Coupling Between Engine and Fan Eliminates Trouble with Bearings

Frequently a mine fan and its driving unit are located near an air shaft or at some other point where a settlement of the ground may occur. In modern practice a fan and its driving engine or motor are placed on the same steel shaft; when this shaft is thrown out of alignment trouble is caused with the bearings. It is for this reason that a flexible coupling is provided between the engine and the fan. The



DETAIL SECTION OF FLEXIBLE COUPLING

arrangement shown in the accompanying illustration has been used by an English firm for a number of years.

The drawings give the details of the coupling and also its relation to the fan and engine. The engine shown is of the two-cylinder tandem, compound vertical type. The arrangement of the coupling is as follows: At the end of the engine crank shaft is a flange forged on solid, to which a small flywheel is bolted. On the fan shaft is another similar wheel. Between these two flywheels is a short shaft about 2 ft. 6 in. over all, with a flange forged solid on each end; on these flanges are bolted two steel plates which are also secured to the two flywheels in the same way. The thin steel plates forming the flexible connections between the shafts allow a slight settlement in the fan or engine foundations without injury to the shaft bearings. The coupling is now being manufactured by an English concern.—*The Engineer.*

## Seamless Tube Wheel Bushings

BY WILLIAM J. TEEMER  
Pittsburgh, Penn.

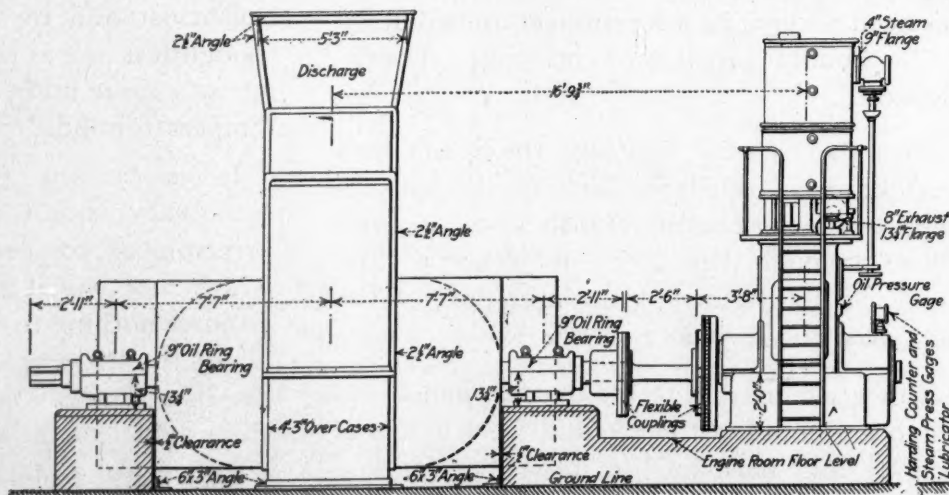
Recently I read an article in *Coal Age*, by E. P. Humphrey, regarding the bushing of worn mine-car wheels with wrought pipe. This practice is good, but it may be considerably improved. Some time ago experiments were conducted upon the use of a "mechanical seamless tube" for the purpose. This tube is made of a high grade of openhearth steel with a carbon content that admirably fits it for this kind of work. Many large mines are now using this kind of bushing material with highly satisfactory results.

## Frog Rerail That Prevents Cars from Leaving the Track

Cars that are off the track may be rerailed by the frog here described. The device also prevents the cars from leaving the rails. It does not interfere in any way with cars running through it on the rails.

The timber outside the rail, the guard rail on the inside, the braces between the guard rail and the wing rail are duplicated on each of the rails opposite the frog. One of the large coal-mining companies has installed this type of rerail device at all the frogs on its main haulage roads. The cost of installation is small, the upkeep cost being practically nothing once it is placed. The delays prevented and time saved by the installation of this rerail at one particularly bad frog on a curve was more than sufficient to pay for its installation on all the main haulage roads.

To make this apparatus the wing rails of the ordinary frog are extended. Straight pieces of track rail from 4 to 6 ft. long are used for this purpose, the length

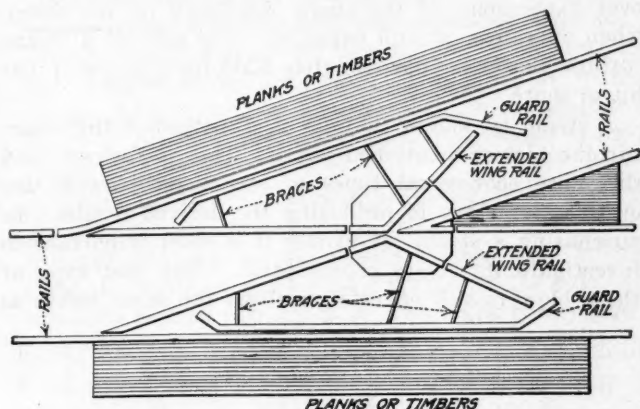


RELATION OF FLEXIBLE COUPLING TO ENGINE AND FAN



depending upon the gage of the track. These are butted against the ends of, and extend diagonally across the track in a line with, the wing rails of the frog. They are spiked firmly to the ties. A better job results if a fishplate is bolted to the end next to the wing rail.

Inside of the opposite rail an ordinary guard rail is placed. The curved ends of this guard rail should be elongated, so that they reach to the end of the extended



THIS RERAIL DEVICE PREVENTS TROUBLE

wing rail. Several heavy timber braces should be fastened between the guard and wing rails. Outside the track rail a heavy plank or timber should be placed tightly against the rail. The top of this timber should be on a level with the top of the rail, and each end should extend several feet beyond the end of the guard rail. This timber raises the flange of the car wheel to a level with the track rail. The extended wing of the frog on the opposite side of the track pulls the car over, and into the frog. As the wheel passes through the throat of the frog, the flange is lifted until the tread is on a level with the rail. At the same time the wing rail crowds the wheel over onto the rail.

Cars that get off the track on the opposite side are also rerailed. Heavy planks or timbers are securely fastened between the point rails of the frog, with their tops level with the top of the rail. These raise the flange of the car wheel level with the top of the rail. The guard rail on the opposite side of track pulls the wheels over onto the rail. A timber or an iron plate between the guard rail and track rail raises the wheel flange on that side, until the tread of the rail will slide over onto the track.

## Electrical Distribution in Mines

BY E. STECK  
Hillsboro, Illinois

The bituminous mines in the central states have a general practice of connecting the entire electrical distribution system underground to a circuit breaker on the surface. This practice has a number of shortcomings. If the circuit breaker trips all the locomotives, cutting machines and other motors are stopped. As soon as the breaker is put in all the motors are thrown on the line, creating a heavy overload on the power-plant equipment. All the machinery below is idle while the circuit breakers are out.

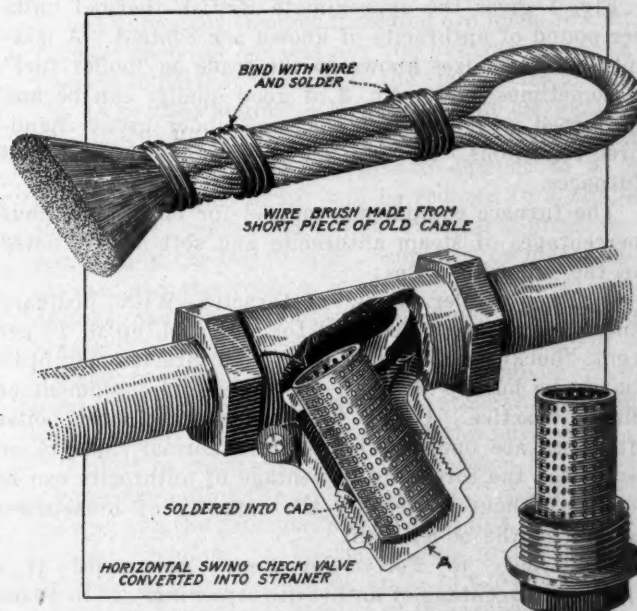
When heavy grounds occur there is no indication of their location. The entire mine is idle until the trouble is found and that section in which the short has occurred is cut off, or the trouble remedied.

By the use of circuit breakers underground trouble can be located much quicker. Only a small portion of the mine will be idle at such times and the starting overload on the plant will be greatly reduced. Take for example a mine having two main entries: A switch-board panel can be placed on the bottom with two circuit breakers and switches, each controlling one-half of the mine. The lights on the bottom can be connected in behind the circuit breaker so that no matter which breaker trips the lights will still be in service. The circuit breakers should be of the switchboard type. This makes each half of the mine independent of the other. This scheme can be further carried out by the location of railway-type circuit breakers at convenient places back in the mine. With such a layout in case of trouble a small part of the mine only is effected and the difficulty quickly located, as it must be behind the circuit breaker which has opened.

The small breakers pay for themselves in a short time because of the shorter shutdowns and the lower number of locomotives and machines affected. The wear and tear for this reason is not so great on the power-plant equipment. If power is purchased, especially where the maximum demand charged is based on short-time peaks, a decided saving in the power bill can be made because all of the equipment cannot then be thrown on the line at once after the main circuit breaker is closed on top.

## Wire Brush and Pipe Line Strainer

The wire cleaning brush shown in the accompanying illustration upper view is made from short pieces of old  $\frac{1}{4}$ -in. hoist cable. The two ends are brought together, forming an eye, the strands being wired in three places and the binding wire soldered. The ends of each part of the cable are then untwisted and spread apart in a



DETAILS OF A WIRE BRUSH AND AN OIL STRAINER

fan-shape so as to make the brush. These brushes have long life and are useful for cleaning machinery parts. The lower illustration shows wornout horizontal swing check valve made over into a strainer for a small oil line. The swing gate was removed and a strainer made of brass wire mesh was soldered into the valve cap, as shown at A. This strainer is cleaned easily.

# Burning Steam Sizes of Anthracite with or Without an Admixture of Soft Coal\*

THE "Burning of Steam Sizes of Anthracite with or Without an Admixture of Soft Coal" is the title of a bulletin which describes, in the simplest terms, how to burn steam-size anthracite, or mixtures of this, with soft coal so as to get the most steam from the least fuel. An effective means of promoting fuel economy consists, frequently, in the substitution of a cheaper for a more expensive fuel. This bulletin describes briefly what modifications of furnace design and operation may be made in order to insure efficiency in burning mixtures of anthracite and soft coal in furnaces designed for one or the other of these two varieties of coal.

While the essential difference between the burning of anthracite and the burning of soft coal consists, in the case of anthracite, in the use of a somewhat smaller volume of air per pound of fuel and a stronger draft, slight alterations in the method of firing and in the furnace itself (designed for one or the other fuel) are also necessary in case mixtures of soft and anthracite coal are used.

There are four sizes of anthracite used for steam generation. These are commonly known as "buckwheat" and are generally classified as follows:

Size of Coal	Size of Round Mesh Over Which Screened, In.	Average Heat Values per Lb. of Coal, B.t.u.
No. 1 buckwheat	★	12,250
No. 2 buckwheat (rice)	★	12,000
No. 3 buckwheat (barley)	★	11,500
No. 4 buckwheat	★	11,000
No. 5 buckwheat	★	10,000

Fig. 1 gives the approximate British thermal units per pound of anthracite of known ash content. A mixture of these sizes known to the trade as "boiler fuel" is sometimes used. No. 3 of good quality can be and is burned with excellent efficiency under proper hand-fired conditions. No. 4 is not so suitable for hand-fired furnaces.

The furnace equipment required for burning various percentages of steam anthracite and soft coal is noted in the following cases:

1. Twenty Per Cent. Anthracite—With ordinary furnace equipment designed for soft coal, up to 20 per cent. "buckwheat" or fine sizes of anthracite may ordinarily be burned without any change of equipment or firing practice. Owing to the fact that most boiler furnaces are operated below their normal capacity on soft coal, the foregoing percentage of anthracite can be added without decreasing the capacity of horsepower output of the boiler plant.

2. Twenty to Forty Per Cent. Anthracite—If a greater percentage of anthracite screenings, 20 to 40 per cent., say, is mixed with the soft coal, it will be necessary, in order to obtain full boiler horsepower, to produce air pressure under the grate. One of the simplest and best methods of obtaining the necessary pressure of  $\frac{1}{2}$  to 2 in. in the ash pit, is to install a blower of the turbine type for each boiler. Such a blower may be

installed very easily and quickly since it may be fitted into the side wall of the ash pit. It should not use over 3 per cent. of the steam developed by the boiler when operating at full capacity. The cost of a steam turbine blower is approximately \$200 for a boiler of 150 hp. or more.

A steam jet blower may be used instead of the steam turbine blower mentioned above. This is cheaper, and the more economical types of steam jet blowers are quite satisfactory in producing the desired results. In purchasing a steam jet blower it is most important to investigate its steam consumption. The best type of these blowers will operate on about the same steam as

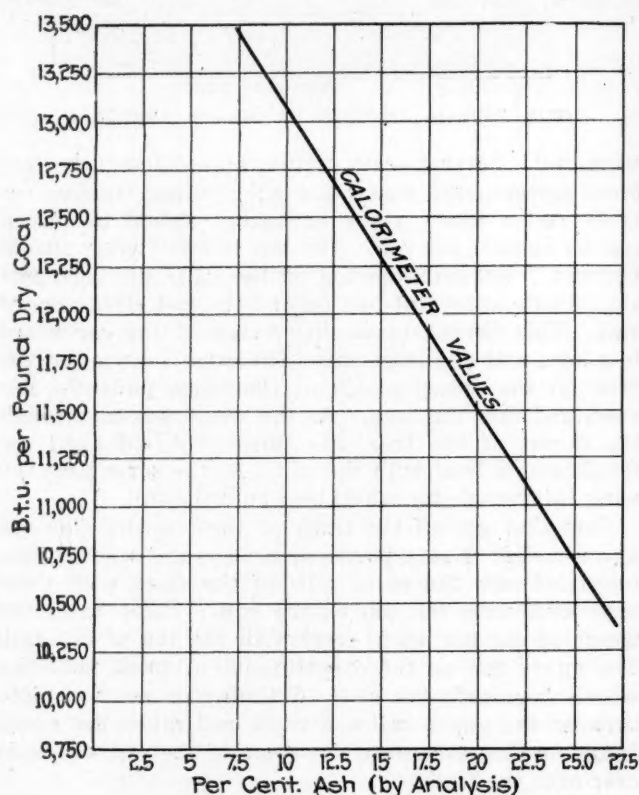


FIG. 1. HEATING VALUES OF ANTHRACITE WITH SIX PER CENT. VOLATILE

that required by the turbine blower, whereas the poorer ones may take from two to five times that amount of steam, in which case they should not be installed. The cost of the steam jet blower should be from \$50 to \$75 or more for a single boiler of 150 hp. and up. The turbine blower, or the steam jet blower, should be controlled by means of an automatic-draft regulator of the "partial throw" type, in order to obtain efficient results, although fair results are obtainable by hand regulation.

3. Over Forty Per Cent. Anthracite—If more than 40 per cent. of small anthracite is used the equipment recommended is forced draft plus "buckwheat" grates and a good automatic-draft regulator. The grates should vary in the matter of diameter of air openings, draft area and total surface in accordance with the

\*Issued by the United States Fuel Administration in collaboration with the Bureau of Mines. Based on an article by William P. Frey, Fuel Engineer.



specific fuels used and their proportions in the mixture. Some plants are able to run efficiently on 100 per cent. of a good quality of fine anthracite if properly equipped for this purpose. The table given below furnishes additional data as to mixtures of various sizes of anthracite and soft coal that may be burned under different conditions of draft.

The proper mixing of soft with anthracite coal is most essential. It can be done either by delivering in a wheelbarrow alternate and predetermined portions of the two kinds of coal, and then mixing by not less than two "turnovers" with a shovel before dumping in front of the furnace, or, on a larger scale, by a similar delivery of car-load lots to the coal tipple where the mixing is done by machinery.

Grates for the fine sizes of anthracite have small air openings which vary in form from round holes, as in the pin-hole grates, to elliptical holes and straight slots, the width of slot or the diameter of the hole varying from  $\frac{1}{8}$  of an inch up to  $\frac{5}{16}$  inch. The percentage of

PROPORTIONS OF SOFT AND HARD COAL TO BE USED  
(For Hand Firing)

		Per Cent.	
		Soft Coal	Hard Coal
No. 1 buckwheat	Forced draft.....	30	70
	Natural draft.....	40	60
No. 2 buckwheat	Forced draft.....	40	60
	Natural draft.....	50	50
No. 3 buckwheat	Forced draft.....	50	50
	Natural draft.....	65	35
No. 4 buckwheat	Forced draft.....	65	35
	Natural draft.....	80	20

draft area through the grate would vary from 3 to 30 per cent.

Stationary, shaking, or dumping types of grates for burning the fine sizes of anthracite may be obtained. The dumping and shaking types facilitate the cleaning of fire with less drop in steam pressure, which is an important feature. A large ash pit is advisable so that fires may be cleaned by dumping or shaking grates, without the necessity of opening the ash-pit doors more than once in 24 hours. The ash-pit doors with forced draft are, of course, sealed to make them air-tight, and therefore, the less often they have to be opened the better. Or still better, separate the undergrate air chamber from the ash pit and install a dead plate in front of grates to dump ashes.

Owing to the slower rate of combustion, the grate area for small sized anthracite is made larger than for bituminous coal in order to develop the same horsepower, except in cases where the soft-coal boiler already has an unnecessarily large grate, which is ordinarily the case. The relation of the grate area to the heating surface is also of importance. This relation is shown in the table below:

For No. 1 buckwheat, 1 to 40.	For No. 3 buckwheat, 1 to 30.
For No. 2 buckwheat, 1 to 35.	For No. 4 buckwheat, 1 to 25.

The fuel bed should not be less than 6 ft. from any point of the boiler-heating surface. There should be from 2.5 to 3 cu.ft. of combustion space to 1 sq.ft. of grate area. Another detail of furnace construction which is important is that of the division of the heating surface into the so-called passes. As the furnace gases in passing from the fuel bed to the stack are continuously cooling, their volume is consequently decreasing continuously so that the area of the passes should

be diminished in the same proportion to cause a uniform flow. The relation between the area of the various passes should be so as to include total boiler-heating surface about as follows: First pass, about 43 per cent. of total heating surface; second pass, about 32 per cent. of total heating surface; third pass, about 25 per cent. of total heating surface. As the width of the gas passage is uniform, the necessary reduction in the volume of the passes is made by reducing the thickness of the gas stream about as follows: In first pass, from 100 to 68; in second pass, from 68 to 52; in third pass, from 52 to 50.

Anthracite coal must be fired evenly in small quantities, and at frequent intervals, the intervals of cleaning depending upon the nature of the coal, rate of combustion, and the skill in spreading thinly and evenly. The leveling bar must be used sparingly, and only for the purpose of keeping the fuel bed level and to keep the thin spots covered up. As a rule it is bad practice to let a fuel bed of No. 1 "buckwheat" grow thicker than 8 in. and No. 2 "buckwheat" should not go over 10 in. and preferably not over 6 or 8 in. respectively. Where an automatic damper regulator is installed, it is important that coal be supplied to the fire in proportion to the air supply; that is to say, as the blower speeds up the firing should also be speeded up, and as the blower slows down the rate of firing should be decreased.

#### PROPER METHOD OF BURNING STEAM ANTHRACITE

With a good grade of steam anthracite, it is possible to obtain almost as high an efficiency as with bituminous, provided the equipment and operation of the plant are suitable; frequently, moreover, large savings in cost of fuel to generate steam are effected by substituting steam sizes of anthracite for the more expensive bituminous coal. The best results cannot be obtained unless the changes indicated are made so that the furnace becomes efficient for the anthracite. It is extremely important in burning the steam sizes of anthracite to provide against a large excess of air to the fire. The ideal way to burn this fuel is to use undergrate draft and to throttle the uptake damper to a point where the volume of air will be reduced to a minimum for proper combustion. The necessary pressure for penetrating the bed of fuel is supplied by means of the blower, and the volume is regulated by means of the up-take damper. With this equipment an automatic regulator should be connected for the purpose of controlling the draft in accordance with steam requirements, all of which is ordinary standard equipment which readily may be obtained for the purpose.

It must be emphasized that the greatest loss in burning the fine anthracite is on account of too much air for the fire, and the principal way to keep this air down to a proper minimum is by using the up-take damper, throttled as much as possible so as to produce the highest CO<sub>2</sub> without the formation of unburned gases. Loss from this source is much less probable than in the case of soft coal, with its high volatile content, so that with good installations, the CO<sub>2</sub> may be run at 15 or 16 per cent., under correct supervision and regulation. This percentage of carbon dioxide indicates that practically no more saving can be made by closing the damper still further.

# The Mine Type Motor\*

By L. C. MOSELEY  
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**SYNOPSIS**—*The severe conditions of mining service, particularly as regards vibration, dust and dampness, has led to the design of a type of alternating current motor particularly adapted to mine service. This machine is entirely inclosed except for ventilation holes and is strongly and heavily built to meet exacting conditions.*

**D**UE to the character of the work in and around a mine requiring motors in different construction from the standard open type of induction motor, a special machine has been designed to meet mining requirements. Since this motor was to be applied to special service, the matter of its design was discussed freely with engineers familiar with mining requirements, and in its development their suggestions were incorporated.

A brief review will be made of the conditions under which such a motor has to operate. The drive of an anthracite coal breaker is about as severe as any to which an electric motor has been applied. The breaker buildings as a rule are immense structures which sway and vibrate, and as a result the motors are subjected to excessive vibration and many shocks. Constant vibration tends to crystallize the shaft, loosen the laminations, break the bars of squirrel-cage rotors, and chafe the insulation on the coils.

The atmosphere surrounding the motor is charged with everything from fine coal dust to dropping pieces of coal, and all exposed parts are covered with dirt and dust. The fine, sharp coal dust works its way into the windings of an open tube motor; and while this dust is a good insulator as long as it is dry, it becomes a good conductor as soon as it is moistened. This may occur as water is used in the process of separating the slate from the coal. Another factor to be taken into account is the starting duty, which is heavy, because shutdowns occur with the machinery full of coal.

In the bituminous fields, much of the coal is shipped as run-of-mine or is screened only. There is, however, an increased tendency to furnish washed coal and as

a result washeries are being installed. Motors applied in these washeries are subjected to conditions quite similar to those in an anthracite breaker. In the mines themselves, motors are frequently subjected to dampness and dripping water.

One distinctive feature of the mine-type motor is its heavy construction. Another feature of the motors built in sizes up to and including the 75-hp. at 900 r.p.m. is the mounting of the back-gear bracket on the stator frame. Fig. 1 shows a motor having this back-gear arrangement.

The frame is of the box type, without openings, and is made of cast iron of heavy section. On machines up to and including 150 hp. at 720 r.p.m. the bosses for the back-gear attachment are cast on one side of the frame; and in order that the bosses shall be far enough apart to make the support of the bracket rigid and to give a sufficient width between the feet to make a rigid support for the motor, the frame is made exceptionally wide. By having the bosses cast on each frame, the back shaft can be mounted at any time desired.

The back-gear bracket is made of one casting which is attached to the frame by four large bolts placed as

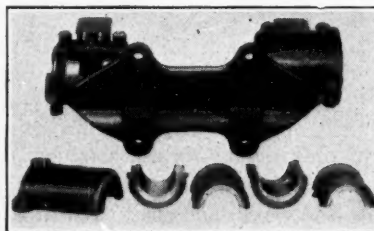


FIG. 2. DETAILS OF BACK-GEAR BRACKET

far apart as possible, as shown in Fig. 2. The bearings are lined with hard babbitt and are arranged for waste lubrication. They are split horizontally, have broad seats at each end, and are interchangeable but not self-aligning. By using this construction, the back shaft can be removed without disturbing the alignment of the bearings, and the bearing can be replaced without removing the shaft. The motor bearings can be replaced without removing the rotor or the lower half of the shield, and the rotor can be removed on the end opposite the gear without disturbing the back-shaft attachment.

Both end shields are split horizontally and are held together by large square-head bolts which are placed so as to be readily accessible. The shields are totally inclosed with the exception of openings at the bottom for the inlet and outlet of air. These holes may be left open or a short length of pipe may be attached in order to bring in fresh air. The shields are interchangeable on the two ends of the squirrel-cage motor, but the wound-rotor machine has a longer shield on the collector end than on the other and is supplied with a hand hole and cover in the top half to give ready access to the brushes. The pulley end shield on both wound-rotor and squirrel-cage motors has a shroud attached to assist in the ventilation of the machine, and the upper half of each end shield has two tapped holes for air-gap measurement. On the wound-rotor machines, the brush studs are securely bolted to the end shields.

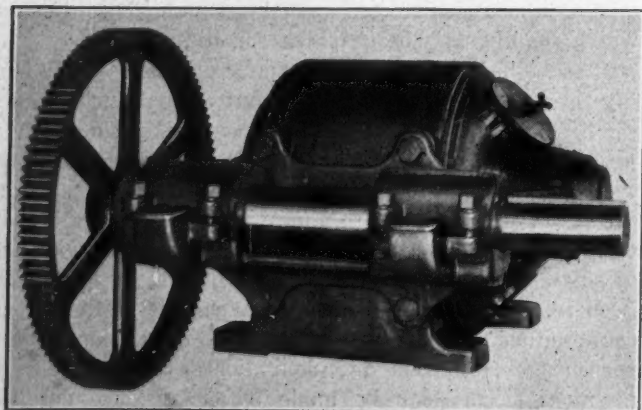


FIG. 1. MOTOR WITH BACK-GEAR BRACKET

\*Abstracted from *General Electric Review*.



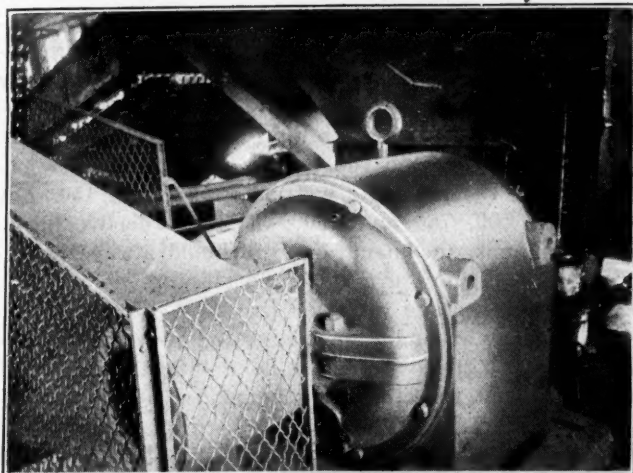


FIG. 3. MOTOR DRIVING SHAKER SCREEN AND PICKING TABLES, DAVIS COAL AND COKE CO., THOMAS, W. VA.

In all cases large bearings are used, split horizontally and interchangeable, being the same on both front and pulley end. Each bearing has two oil rings and two broad seats, one at each end of the lining, hence they are not self-aligning. Considerable trouble had been encountered on bearings having a single seat when used on a geared motor for very severe service due to the vibration pounding the seats out of shape. Special attention has been given to make the bearings both dust-proof and as free from oil leakage as possible. The oil-well covers are lined with felt and are held closed by a spring. Both bearings have overflow oil gages.

Both the motor and back-gear shafts are of heavy construction, so as to minimize the vibration and lessen the tendency of the shafts to crystallize. In order to make the rotors interchangeable, the motor shaft is made for pulley extension, whether the motor is to be used for belting, gearing or otherwise.

In the design of the rotor, special attention has been given to making it as rigid as possible in order to resist the shocks and vibrations arising from gearing. The rotor spider has an extra long bearing surface on the shaft, to which it is securely keyed. The squirrel-cage rotors have electrically welded end-rings of large section and ample radiating surface, and the conductors are forced into the slots without any slot armor or wedges, thus insuring a rotor that is practically indestructible unless injured by some mechanical means. The windings of the wound rotor motors are similar to those used

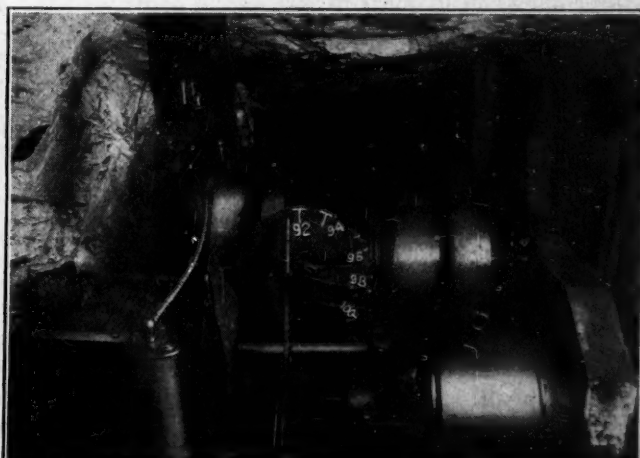
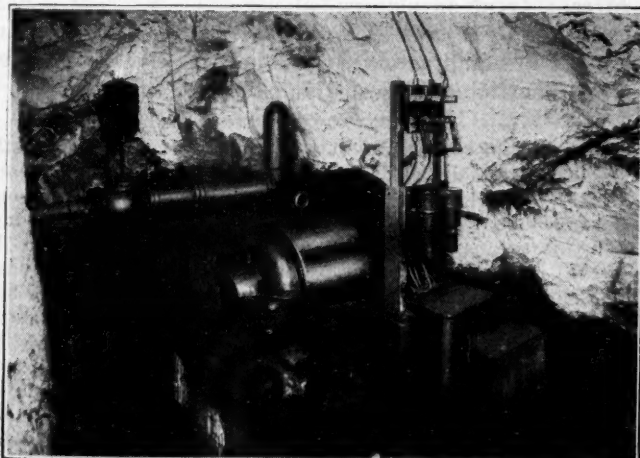
on standard machines, except that the windings have special moisture-resisting insulation. The collector rings are made of brass and are shrunk on the shell over insulation, the shell being pressed on the rotor shaft.

As straight slots are used on the stator, the coils are exactly shaped, form wound, molded and completely insulated before being placed in the slots, the same as are those used in standard motors with straight-slot stators. All stator windings are insulated to resist moisture. Space blocks welded to adjacent punchings are used to separate groups of laminations and thus form ventilating ducts.

Since the continuous rating of an electrical machine depends on the amount of heat that it will dissipate, special attention has been given to the ventilation of the mine-type motor. Sheet-iron fans are attached to the rotor flange on the pulley end. These fans draw air from the outside through the ventilating hole in the bottom half of the end shield. To prevent the air from being forced through the spider and out the other side of the machine, thus failing to strike the windings and punchings, a deflector is placed on the end of the rotor opposite the fan. The air current is thus divided, part of it being forced up over the stator windings and part being forced through the rotor ducts, thus keeping the temperature of the machine at a safe operating value. It is desirable to have only clean air circulate through the machine; and to accomplish this, a short length of pipe is attached to the holes in the end shields to bring in air from the outside.

The mine-type motor is used for driving crushers, belt conveyors, shaker screens, and picking tables, underground hoists, pumps, crushers and similar machines. Because of the heavy character of the work and the dampness usually encountered underground, many installations require a motor of the mine type, the inclosing features tending to keep the dripping water from the windings and the heavy construction tending to reduce vibration.

Although primarily designed for mining service, these motors can be applied to other classes of duty which require an inclosed ventilated motor of heavy construction. A considerable number of mine-type motors have been installed for steel mill auxiliary drive, such as approach tables, straighteners, soaking pit covers, etc., where the character of the work is closely akin to mining requirements. These motors operate in buildings where the atmosphere is filled with dust and small bits of metal, and where in some cases the temperature of the air



FIGS. 4 AND 5. TYPICAL MOTOR INSTALLATIONS UNDERGROUND, ONE DRIVING A PUMP, THE OTHER A HOIST

may be considerably higher than is ordinarily encountered. To meet this later condition, if found necessary, the stator and rotor windings are given a special heat resisting insulation.

In logging operations, motors of the mine type have been installed on the donkeys for dragging the logs from the woods to the loading platforms. These donkeys are portable and the motor installed on the rig is subjected more or less to outdoor conditions, thus necessitating the use of an inclosed ventilated motor. The service is somewhat akin to hoisting, in that frequently high torque is required for starting, and to meet this requirement a wound-rotor machine is applied as it can give a starting torque considerably in excess of normal.

## Mine Electric Lighting

BY TERRELL CROFT.

University City, St. Louis, Mo.  
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**I**N LIGHTING a mine electrically no definitely formulated rules can be followed. There are, however, two general principles which should be observed: (1) Where feasible equip the lamps with shades so as to minimize or eliminate glare. (2) Provide sufficient light at the locations where men work constantly so that the possibility of accident will be minimized. In some coal mines it is the practice to light the main entry with 25-watt lamps spaced at 300-ft. intervals, the object being to insure the silhouetting of objects which may obstruct the passageway. At side-entry junctions, use is made of two units, one to illuminate the switch and junction while the other illuminates a portion of both the main and side entries, and thereby tends to eliminate collisions.

Electric lighting safety requirements are expressed in the following Rule 51 from Bureau of Standards "Standardization of Electrical Practice in Mines": "In any part of a mine where there is danger of igniting gas or coal dust, electric lamps, if installed, must be of the inclosed vacuum type, and they shall be inclosed by gas-tight fittings of strong glass and shall have no flexible cord connections. Electric lamps shall be replaced only by an authorized person. In all machine rooms and other places in gaseous mines where the failure of electric light is likely to cause danger, some safety lamps or other proper lights, not fewer than the number to be prescribed for such place by the inspector, shall be kept for use in the event of such failure."

Incandescent lamps are now used to the exclusion of electric light sources of all other types for mine illumination. While carbon filament lamps which have the low efficiency of 3.1 watts per candlepower are still used to some extent in mine service because they provide long life on varying voltage, they are gradually being displaced by the more efficient tungsten lamp. The metallized-filament or gem lamp has a filament of carbon which has been so treated that its electrical properties resemble those of a metal. It has an efficiency of about 2½ watts per candlepower. It is probable that in the near future both the gem and the carbon filament lamp will be withdrawn from the market.

The tungsten-filament vacuum or Mazda Type-B lamp has an efficiency of about 1 watt per candlepower. It is obviously more efficient than either the metallized or

carbon filament lamp, but has the offsetting disadvantage of being considerably more fragile. The nitrogen-filled or Type-C Mazda lamp has an average efficiency of about 0.75 watt per candlepower. The Type-B lamps are ordinarily obtainable in the following wattages: 10, 15, 25, 40, 50, 60 and 100. Type C lamps are now obtainable in the following wattages: 75, 100, 150, 200, 300, 400, 500, 750 and 1000. When ordering incandescent lamps, the manufacturer should always be advised if the lamps are for mine circuits, on which a considerable voltage variation may be expected.

In lighting around a shaft near the switch where the breaking and the switching is done 40-watt lamps with shallow dome reflectors may be placed above and between the tracks. The units can be spaced at about 7 ft. intervals and mounted about 7 ft. above the rails. The resultant initial illumination is about 4- or 5-foot candles at the floor.

Frequent whitewashing of the walls of underground offices, mule stables and the like will increase materially the illumination of these parts of the mine—or a greater illumination will be available with a smaller energy expenditure.

Underground rooms, mule stables, and the like may be illuminated with 40-watt lamps equipped with angle reflectors mounted on the wall and as high as possible. One unit can be used for each two stalls. In front of the stalls opposite the angle units, 25-watt lamps with deep bowl reflectors may be used to illuminate the feed boxes and the passageway. Underground mine offices are usually small rooms containing a telephone. One 25-watt lamp equipped with a shallow dome reflector will furnish illumination for the interior, but some means should be provided for lighting the entrance so that it can be easily located in the case of fire or accident. Either an angle or a shallow dome reflector with a 25-watt lamp can be used for this purpose. The fire board in the office at the foot of the shaft should be well illuminated with one or two 25-watt lamps equipped with angle reflectors, the number depending upon the size of the board.

Electric lighting circuits should always be arranged so that the lamps operate at from 100 to 125 volts because this pressure is the most economical for incandescent lamps. Two hundred and twenty-volt lamps are uneconomical. The three-wire system is desirable where an incandescent lamp load is considerable. Such a system may be obtained readily from an alternating-current circuit by using a balance coil. Where it is necessary to light from 250 or 500-volt direct-current circuits the usual practice is to connect in series two 125 or five 100-volt incandescent lamps across the circuit.

THE EFFECT OF AN INCREASE in the impurities in domestic sizes of anthracite coal is much more serious than in steam sizes. While good results are obtained with pea coal, containing 8 per cent. of slate and the same amount of bone, yet this means a total of 16 lb. of impurities in 100 lb. of coal purchased. When the impurities exceed this amount to any great extent the result may be satisfactory, but it necessitates more frequent removal of ashes; also, the fire requires more attention—this in addition to the increased cost of the fuel to the consumer. Pea coal containing 20 per cent. of slate is practically worthless for low-pressure boilers; in high-pressure work, reasonably good service is possible; but also in this case ashes must be removed at more frequent intervals and more attention given to the fire.



# Preparation of Bituminous Coal—VI

BY ERNST PROCHASKA  
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**SYNOPSIS**—After coal has been washed it must be freed from adhering moisture before it can be shipped. Draining bins, elevators, conveyors and centrifugal dryers are some of the means employed for this purpose. The water must also be clarified or the amount necessary will be excessive. The sludge must be dried and if possible pyrite recovered.

**W**ASHED coal must be freed from adhering moisture before it can be shipped to market. Coal larger than  $\frac{1}{2}$  in. can be dewatered easily by simply passing it over draining screens, but the dewatering of finer sizes is a different problem and the methods used at present do not give entirely satisfactory results. We should not overlook therefore any efforts for further development and improvement in the process of dewatering the fine coal.

Before we can discuss intelligently the methods used at present, we must first determine the purpose of the dewatering process and the scope of the demands made by it upon the apparatus used. The final purpose of dewatering is to produce a coal of the highest possible value. This will permit us to predetermine in each separate case the most economical degree to which the dewatering should be carried. Some typical cases are as follows:

**Coking Coal.**—A moisture content of from 6 to 8 per cent. is the most suitable for the coking process in retort ovens when utilizing the byproducts. Therefore the coal, if the character and size will permit, must be dewatered to this extent. If this is not possible, other means must be employed to help out. Dry-screened dust may be mixed in or even dry-screened fine coal. The amount of the unwashed coal which can be thus mixed in depends upon the percentage of ash it contains.

**Fuel Coal.**—The degree of dewatering of fine coal depends upon the demands of the consumer, but the moisture should not exceed 10 per cent. Mixing in of dry unwashed fines will also be of some benefit, but the recrushing of coarse coal for this purpose should be avoided ordinarily on account of the greater value of the coarser sizes.

The following may be considered, taking into account the difficulties of dewatering and the rapid increase of these difficulties with any decrease of the moisture in the final product. As much as the conditions permit, the drying of the fine coal should be aided by the mixing in of dry raw coal.

In most cases greatest possible dryness of the coal is required. The requirements of this dryness should be established beforehand by a guaranty in regard to the permissible upper limits of moisture in the final product, so that the washery as well as the consumer may have fixed data to go by.

Simplicity of installation demands the smallest possible space, low power consumption and small cost of installation and operation. The dewatering of the fine coal, appearing at first sight to be easy, thus becomes a

difficult problem made more difficult by the inclination of the fine coal to pack together in dense cakes containing a high amount of water.

The continuous stream of coal coming from the mine does not allow, except at high cost, the devoting of much time to any one separate stage of its preparation. One process must follow another without appreciable intervals or interruptions. Even in the storage bins the coal does not remain for any length of time. It must be loaded out continuously. A coal washery knows only the following alternative—few swiftly operating pieces of apparatus or a great number of slower-working machines. For all previously enumerated apparatus the principle of quick operation is easily accomplished; the treatment of fine coal offers serious difficulties which still remain to be solved satisfactorily.

The methods to be employed for drying coal must be adapted to the character of the material. This requirement demands especial consideration. It is impossible to prefer one method above all others at first sight. The character of the fine coal from different mines shows many variations. With a hard, not easily shattered slate the fine coal, and especially the sludge, are innocuous. The dewatering is comparatively easy and can be, at least partly, combined with the water clarification process. But if the slate, or what is even worse, the slate and coal are disposed to produce a microscopically fine pulp held in suspension in the water, the process of dewatering must be carried on in an entirely different manner. The separation of the fine coal from the pulp must be accomplished in the early stages of the process if it is to be carried out successfully.

## METHODS OF DRYING

Considering the requirements set forth we have the following methods for drying in use at the present time: (1) Dewatering in bins or pits; (2) dewatering on slowly moving conveyors; (3) centrifugal dryers; (4) filters (for sludge only).

Draining pits were fully described in Vol. 14 of *Coal Age*, pp. 1072-1075. In addition to this description it might be mentioned that the dewatering of the fine coal is also accomplished to some degree in the commonly used storage bins. A storage of 48 hours will reduce the moisture in the coal to from 10 to 12 per cent. In Europe draining bins are commonly employed and the draining off of the water is accelerated by the use of filter bodies made of expanded metal, which open up the densely packed mass of fine coal. The following results have been obtained with this type of bin:

Capacity of Washery in Tons per Hour	Contents of Bins in Tons	Number of Bins	Time Required Filling-Dewatering of One Bin in Hours	Capacity of All Bins in Tons per Hour	Degree of Moisture in the Dried Coal, Per Cent.
100	600-1200	4-12	2-6      20-48	20-120	8-13
150	1200-2000	8-20			
200	1400-3000	10-24			

The disadvantages of draining bins are as follows: On account of the large surfaces the sludge settles out of the water, considerably delaying thereby the process of dewatering. On account of the lack of other drying apparatus, all sludge produced must be sluiced into the

draining bins, there to be dewatered. The delays also the rapid draining off of the water. In emptying the bins, the coarse coal flows out more rapidly than the fine coal and the sludge, which later clings to the walls. When the bins are emptied this sludge hangs to the walls for some time and drops off suddenly in large masses. This destroys that uniformity of the coal which is desirable for the coking process. The bins also require considerable space in all directions, and if the ground area at disposal is limited it will bring about a cramped or less desirable arrangement of the other apparatus.

Draining conveyors work on quite a different principle. They dewater the fine coal on its way to the storage bins. No special dewatering device is necessary, as the conveying apparatus required in any case is adapted to dewatering the coal. Conveyors or elevators can be used for this purpose, depending upon the juxtaposition of the jigs to the storage bins. When these machines are employed the washed coal can be sluiced from the jigs directly into the conveyors. With elevators the coal must be sluiced into a settling tank out of which the elevators feed. The drained-off water, carrying fine particles of coal in suspension, is sluiced into separate clearing tanks. Dewatering elevators and conveyors must be built heavy, depending upon the character of the coal, the required capacity, and the distance over which the material must be conveyed. This is the more important since the speed of the conveyors must be slow in order to give the water time to drain off.

The following table gives some data on dewatering elevators and conveyors:

Type	—Dimensions—		Slope	Speed,	Capacity	Power,	De-watered to Per Cent. Moisture
	Width	Length,	in Deg.	Feet per Minute	per Hour in Tons		
Dewatering conveyor	32 in.-13 ft.	50-130 ft.	0-40	1½-12	5-60	4-18	10-13
Dewatering elevator	20 in.-6 ft.	50-130 ft.	40-65	3-32	10-60	12-32	10-13

Centrifugal dryers, on account of their high speed, are restricted in regard to the dimension of the diameter of the revolving parts. To accomplish a satisfactory capacity only centrifuges with continuous feed and discharge can be considered. At present only two types of centrifugals are in use. In one the dried coal is discharged continuously, being scraped off the screen plates by knives which rotate at a speed different from that of the screens. In the other type scrapers are not used and the coal is discharged from the screens through trapdoors which open and close intermittently.

The results with the centrifugal dryer, as far as the delivery of dry coal is concerned, are very satisfactory. The moisture in the dried coal is reduced to an average of 6 per cent. The power requirements are not excessive, dryers with a capacity of 60 tons per hour using from 35 to 50 horsepower.

The greatest disadvantage noticed in the operation of centrifugal dryers can be traced to the rapid wearing of the screen plates which, on account of the small perforations, must be made of thin steel. A solution of this problem would be to use a protecting grate inside of the screens and to allow a thin layer of coal to remain on the screens. This would act as a filter bed and protect the screen against the abrasive action of the coal. Besides the frequent renewals of screen plates, which require the installation of at least one spare dryer,

the resulting sludge caused by the grinding action of the centrifugal force upon the coal is another and serious drawback. At present, however, centrifugal dryers are the most efficient pieces of apparatus we have for the purpose of reducing the moisture in the washed coal below 10 per cent. It should also be stated that the coal feed to the dryers must be partially dewatered

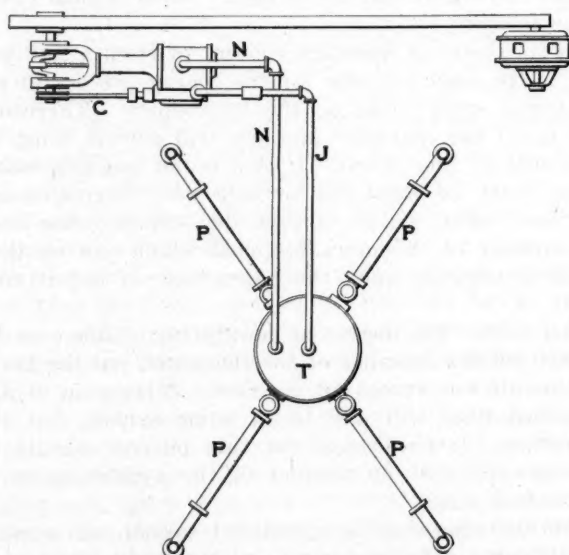
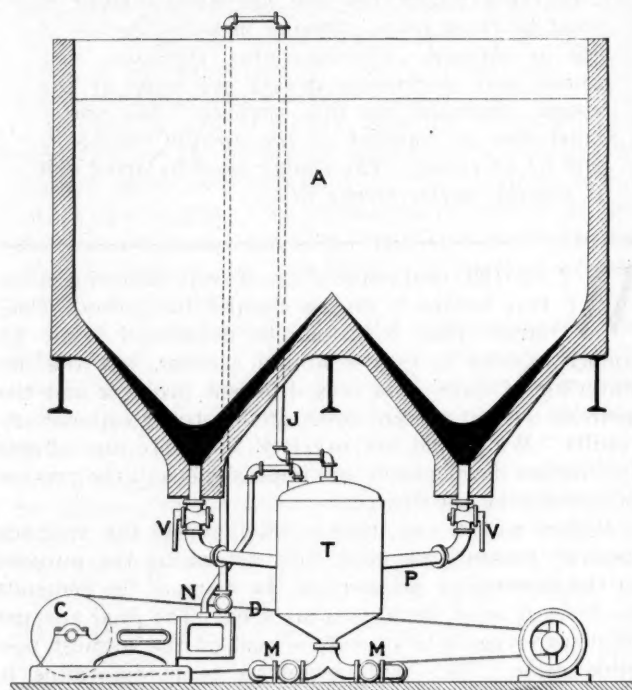


FIG. 20. ARRANGEMENT OF A COMPRESSED AIR INSTALLATION FOR CONVEYING SLUDGE FROM CLEARING BASINS

to at least 15 per cent. moisture, which can be easily accomplished by means of a dewatering elevator.

Filtering apparatus can only be used for fine coal and is best adapted for the dewatering of sludge. Such devices will be described in connection with sludge recovery.

The clarification of the wash water and sludge recovery are carried on side by side in one process. The dirty wash water is separated into clear water on the one hand and concentrated sludge on the other. The clear water flows to the pump cistern and from there is put



into circulation again by pumps. The concentrated sludge is either mixed with the washed coal, with or without further treatment, or stored away in separate bins for boiler-house use; or even in the worst case wasted on the refuse dump. The materials to be considered consist of the overflow water from the settling tanks and the dewatering apparatus.

The process of clarifying is carried on either in large settling basins or in a series of pointed boxes (*spitzkasten*). The employment of clearing basins has been almost abandoned for reasons previously given. The use of *spitzkasten* has never become popular on account of the large floor space required and the difficulty of removing the concentrated sludge. In a few isolated installations conical clearing tanks of large dimensions, similar to the Callow tanks, have been built but the resulting sludge could not be drawn off in a sufficiently concentrated state or with any degree of regularity. The Dorr thickeners which were taken over from ore-dressing plants have given thus far the most satisfactory results.

The clarification of the wash water must be carried out to such a degree, that considering the necessary addition of fresh water no increase in specific gravity shall occur. Since the quantity of fresh water required to make up for the loss caused by evaporation, the water carried away from the coal, refuse and sludge and by leakages, can be easily determined, we can state: The water clarification is to be carried to such a point that the addition of fresh water shall not exceed the loss of wash water. This means that no water shall be wasted on account of its being too dirty to be put back into circulation. The reason for this is that the cost of water, on account of the immense quantities used, is quite a consideration. A washery treating 2000 tons in eight hours circulates in that time over 1½ million gallons of water.

#### METHODS OF CONVEYING SLUDGE AND WATER

The cost of water clarification and sludge recovery should be as small as possible. Little has been done in the way of improvement in this direction. The apparatus employed for settling out the sludge should be arranged in such a way that unnecessary power requirements for the conveying of sludge and water may be avoided. Two methods can be used to accomplish this: (1) The settling apparatus may be located at such an elevation that the overflow water from the tanks can flow by gravity to the clarifying apparatus. This will, however, require in most cases a lifting of the cleared water and the concentrated sludge to their respective places. (2) The clarifying apparatus may be placed sufficiently high so that the cleared water as well as the concentrated sludge can flow by gravity to the places where they are to be used. In this case the overflow water from the settling tank must be lifted to the top of the clarifying apparatus. This latter arrangement has the advantage that it avoids the troublesome elevating of the concentrated sludge and furthermore that it makes the space underneath the clarifying apparatus accessible. The materials used for the construction of the settling tanks are usually either timber (redwood), steel or reinforced concrete. The concentrated sludge can be conveyed by means of centrifugal pumps, diaphragm pumps or by compressed air. Centrifugal pumps can be used when the sludge must be elevated above the permissible height of suction.

Diaphragm pumps can only be used on suction lifts and are really used more often as a device wherewith to regulate the flow of sludge than as a conveying medium. Compressed air has been largely used in Europe for conveying the sludge from the clearing basins. In Fig. 20 the arrangement of such an installation is clearly shown. The four discharge points of the clearing basin A are connected by the pipes P with the tank T. Communication between any of the four discharge points of the clearing basin and the tank T can be made and interrupted by the valves V located in the pipes P. From the tank T the pipe J leads to the air compressor C. The three-way cock D permits connection of the tank T through the pipe J either with the atmosphere or with the compressor C. To start operation, the pipe J is connected with the atmosphere and the valve V is opened at the same time. This permits the sludge to flow into the tank T. Should the sludge not flow as freely as desired, the cock D can be turned in such a way that the compressor takes the air from the tank T, creating thereby a partial vacuum in the tank. This accelerates the flow of the sludge. A float indicates the amount of sludge in the tank. As a further safeguard the pipe J is carried well above the top of the clearing basin, so that no sludge can enter the compressor. When the tank has been filled with sludge, the valve V is closed, the compressor started, delivering compressed air into the tank through the pipe N. Now, by opening the valve M the sludge is forced out of the tank.

#### PUMP VERSUS COMPRESSED AIR

The question yet remains as to whether pumps or compressed air is preferable for the conveying of sludge. Conveying by means of compressed air is mechanically more perfect. The sludge can be thicker than if handled with pumps, without increasing the wear and tear on the apparatus. But the cost of the installation is considerably higher and the operation requires more careful attention. Smaller washeries will therefore prefer pumps, especially if the nature of the sludge is such that the wear and tear on the pumps is not excessive. Larger washeries having great quantities of sludge to handle should consider compressed air as a medium for conveying it, especially as an air-compressing plant is more or less a necessity around a mine.

The following table shows some results obtained with *spitzkasten* clearing basins:

Capacity of Washer per Hour in Tons	Total Clearing Surface of Spitzkasten in Sq. Ft.	Number of Boxes	Cleared Water per Minute in Gallons	Concentrated Sludge per Minute in Gallons	Power Required to Lift Sludge, Hp.	Power Required to Lift Water, Hp.
100	860-1620	3-6	1765-4414	4.4-22	5-15	60-86
150	1076-2152	5-8	2647-6621	9.0-33	6-30	70-100
200	2152-3230	5-12	3530-8828	17.5-44	10-30	90-130

As mentioned previously, the process of clarifying the water is carried on either in large settling basins or in a series of *spitzkasten*. In actual fact, however, little has been accomplished in this respect. In most cases the same water is used over and over again until it becomes too thick for any further use. It was, and still is, the common practice to run a washery with one filling of water, according to the nature of the raw coal, say for from three days to two weeks, and at the end of this period to empty all the jig and settling tanks and fill them up again with fresh water. This is a crude

method, but for the lack of something better it was tolerated even if every washerman condemned it.

This deplorable condition remained unchanged until the advent of the Dorr thickener. This apparatus embodies a highly efficient, economical and mechanically perfect device for settling out the fine impurities. The Dorr thickeners make it possible to recover as a clean, granular coal material which normally goes to waste, and at the same time furnishes a wash water as pure as originally supplied to the system. The operation of these thickeners is entirely automatic and continuous. Power and operating cost are almost negligible. They may be installed in any form of circular tank or basin up to 200 ft. in diameter. If the nature of the ground permits, simple excavations with concrete overflow rims are often used.

The settled solids are continuously discharged in the underflow as thick sludge. The operation of the thickener may be so controlled as to deliver an overflow either entirely clear or containing a certain percentage of solids. For an installation of given size, the natural settling rate of the material being handled and the rates of feed and of underflow determine the amount of solids in the overflow.

It has been found that the thickener works best if the feed does not contain material larger than 20 mesh. As the overflow from the washed-coal settling tanks, and more especially from the centrifugal dryers, contains a good deal of coal bigger than 20 mesh, it is advisable to put in a classifier ahead of the thickener for the purpose of removing the coarse particles of coal in a dewatered state and to pass only the fine slime to the thickeners.

#### DETAILS OF DORR CLASSIFIER

The Dorr classifier, as shown in Fig. 21, consists of a shallow, rectangular tank with a sloping bottom. The tank may be set at any desired slope, usually about  $2\frac{1}{2}$  in. to the foot. The feed to the classifier is continuous; all granular material settling to the bottom of the tank is raked up the incline by reciprocating rakes and discharged at the high end above the water level. The fine and more slowly settling solids overflow with the excess water at the opposite end. Broadly speaking, the slope of the bottom, the speed of the rakes, and the dilution of the feed determine the character of the two products.

The classifier serves to dewater the granular coal and to remove the remaining small amounts of coal slime, which can be settled out in the thickeners. Fig. 22 shows a Dorr thickener of 70 ft. diameter with concrete tank. The flow sheet given in Fig. 23 shows a typical arrangement for a water-clarification and sludge-recovery plant.

The power required for operating a 70-ft. Dorr thickener is about 1.5 hp., and the speed of the rakes is approximately from 4 to 8 revolutions per hour.

Under normal conditions of the overflow water from the washed-coal settling tank 30 gal. per minute can be cleared per 100 sq.ft. of settling area, so that a 70-ft. thickener will be able to handle the overflow water from a washery treating 100 tons of coal per hour, if we assume that the water required for washing will be three times the weight of the coal, or 723 gal. of water per ton. The overflow can be easily cleaned so that it does not contain more than 2 grams of solids per liter (approximately 117 grams per gallon) or only 0.2 per cent. of solids. The underflow or the sludge can be

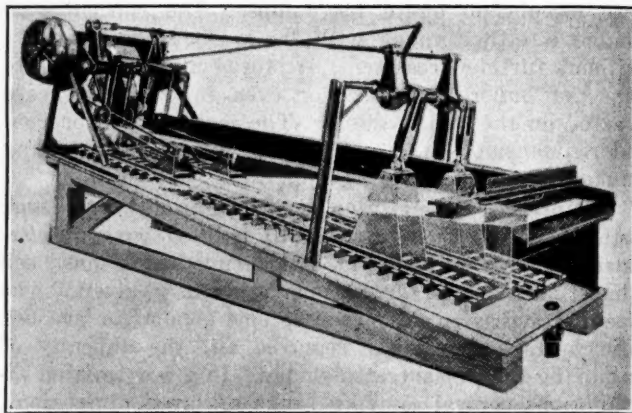


FIG. 21. VIEW OF A DORR CLASSIFIER

concentrated so that it will contain up to 58 per cent. of solids. This is about the limit of density that will still permit the handling of the sludge through pipes or with pumps.

A sludge containing too much impurity to be mixed in with the washed coal entails great losses upon the economic operation of a washery. Furthermore, this sludge, if wasted upon the refuse dump, will fire in course of time and is liable to cause thereby much trouble and damage.

The loss of combustible with the sludge is of greater importance with coking coal, where the fines are of greater value than with fuel coal. Therefore, efforts to treat the sludge for fine-coal recovery are advisable. Many different methods have been tried, but thus far the results obtained have been only mediocre. This is not surprising, considering the fineness of the material. The possibility, however, of a separation can be based upon the fact that even the smallest particles of coal show a granular structure, whereas the fireclay or the crushed slate are of such a fineness that the particles are held in suspension in the water.

#### ALL FIRECLAY SHOULD BE REMOVED

Successful separation of coal from the sludge demands a distinct difference in the size of the grains. The requirements are that the fireclay shall be removed from the sludge as much as possible without great loss of coal. Up to the present time the only successful method for such a separation depends upon a swift current of fresh water in the shape of sprays, but the tendency at present leans toward the use of apparatus now employed in the ore-dressing plants, such as slime tables or Dorr classifiers.

One important piece of apparatus at present operating at least halfway successfully is the Kohl-Simon screen, shown in Fig. 24. The screens having fine brass-wire mesh (65 mesh to the inch) are hung at their upper ends on the swinging rods *A* and on their lower ends on the bails *B*. The eccentrics *C* give the screens a reciprocating motion and at the same time the double cams *D* impart to the screens a forcible vibrating motion.

The sludge to be treated is sluiced onto the screens through the launder *E*. Fresh-water sprays are forced against the sludge through the pipe *F*, which has  $\frac{1}{2}$ -in. holes over its whole length on the under side. These sprays wash the fireclay, which has finer grains than the coal, through the screens into the launder *G*. The fine coal freed from the fireclay travels over the screens and is collected together with part of the wash water



in the launder *H*. The following results were obtained with this apparatus:

Daily Input In Gallons	Solids Per Cent.	Fresh Water Used in Gallons	Clean Coal Tons	Coal Produced Ash Per Cent.	Moisture, Per Cent.	Resulting Dirty Amount of Water in Gallons	Dirty Water Solid Matter Ash Per Cent.	Coal Per Cent.
60,000	10.39	63,000	4.78	8.16	14.78	120,000	39.74	60.76

Instead of shaking screens, revolving screens are also used. These screens have a perforated zinc mantle with a fine brass-wire mesh fastened securely thereto on the inside. The fireclay is washed through the screen by fresh-water sprays, just as with the shaking screens.

The use of slime tables is still in an experimental state, but judging from the results obtained in the ore-dressing plants a successful operation can be expected. The Dorr classifier has been used in the anthracite region to recover coal from the breaker slush. Over 55 per cent. of the coal contained in the slush was recovered and the ash reduced from 30 per cent. to 22 per cent. This was further reduced to 16 per cent. by treating the recovered coal on tables.

All known methods of treating the sludge can only be used to a limited extent. Success can only be expected if the impurities are in finer grains than the coal. This requires preliminary investigations, which will also give data in regard to the size of the screen perforation. Sludge with 30 to 40 per cent. ash treated over screens with sprays gave a recovery of about 20 to 30 per cent. of coal with from 8 to 10 per cent. of ash.

#### DRYING OF THE SLUDGE

The sludge, treated or untreated, must in every case be dewatered before it can be mixed with the washed coal. On account of the fineness of the material centrifugal dryers cannot be taken into consideration. Heat dryers are not an economical proposition and therefore we must have recourse to filters. The requirements for filters are identical with the requirements for all the other apparatus used in a washery—that is, continuous operation, high efficiency, simplicity of construction, low cost of installation and operation, and durability.

Nobody will expect that any one piece of apparatus will

fulfill all of the foregoing requirements, but in regard to filters the continuous drum-type comes nearer to doing it than any other. Sludge containing 35 per cent. solids and 65 per cent. liquid has been dewatered with it to only 20 per cent. moisture. This will make it appear feasible that a sludge with 56 per cent. solids and only 44 per cent. liquids can be brought down to at least from 12 to 15 per cent. moisture. This would put the sludge in such shape that it could be mixed with the washed dried coal without increasing the moisture content of the final product to any appreciable extent.

Pyrites are found in the coal either in the form of sulphur balls or in the shape of fine scales and grains disseminated throughout the mass. The separation of the pyrites from the coal does not offer any appreciable difficulties on account of the great difference in the specific gravities of the two materials. The specific gravity of pyrites is from 4.9 to 5.2, and even the slate carrying fine flakes of sulphur has a specific gravity of only slightly below 3.

A more serious problem is how to prepare the pyrite if it occurs in considerable quantities. This can be best accomplished by wet separation, and the following methods are used:

1. If the pyrite appears in large pieces or is contained within large pieces of slate, hand picking and subsequent separation into pure pyrite and mixed products is advisable.
2. Instead of hand picking, the heavy pyrite can also be recovered in coarse coal jigs, which have an auxiliary screen sloping toward the center. The pyrite is removed from the lowest point of the screen through a kettle valve. In some instances nut coal jigs have a separate bed for the separation of the pyrite and three products are made in the following manner: (a) Pyrites through an artificial bed and screen into the hutch; (b) slate through a slate gate, located at a somewhat higher level, and (c) clean coal overflowing in front of the jig.
3. Rewashing of the refuse is a method especially advisable for large size pyrites.
4. For fine pyrite the methods under (b) and (c) can be adapted by using a fine coal jig.

5. If the pyrite is so finely disseminated that it partially goes over with the sludge, it settles out in the clearing basins and the sludge rich in pyrite can be treated on tables. On account of the small quantities of pyrite in coal the economic results gained by its recovery usually lie within narrow limits. The great price fluctuations of sulphur are also discouraging, and under normal conditions a lasting profitable operation is at best doubtful. In a washery the jigs use most of the water required, but depending upon the different installations water is also used for spraying, in dust collectors, and in sludge treatment. In a general way it can be assumed that about from three to six tons of water are

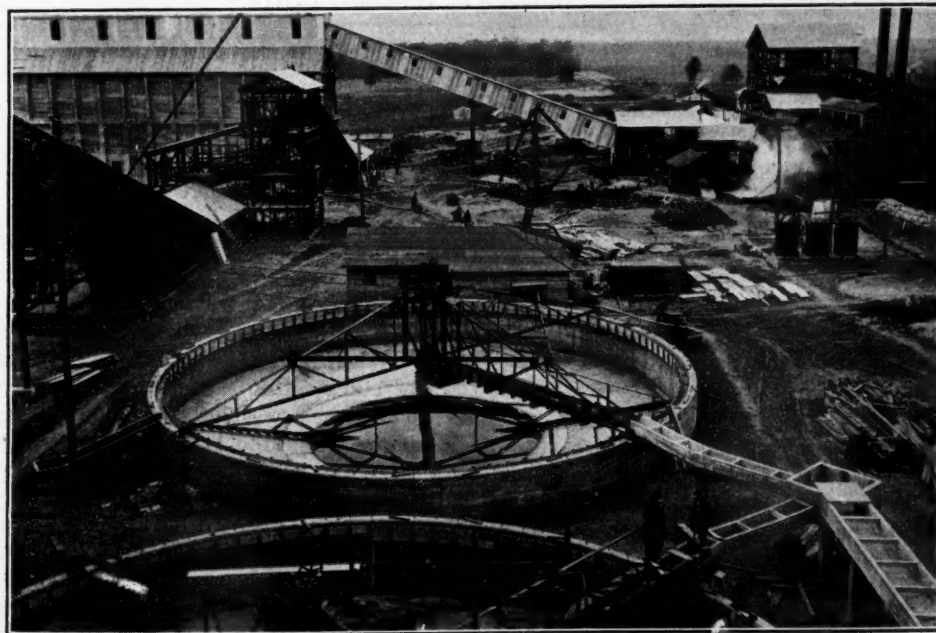


FIG. 22. DORR THICKENER, 70 FT. IN DIAMETER. WITH CONCRETE TANK

required for each ton of coal, or from 725 to 1450 gal. of water must be put in circulation for each ton of coal treated. But the amount of water actually necessary varies a great deal with the character of the raw coal, the number of sizes made and the expected output. The last point demands especial consideration.

The water consumption increases immensely if the washery is overloaded. In such cases the water must as-

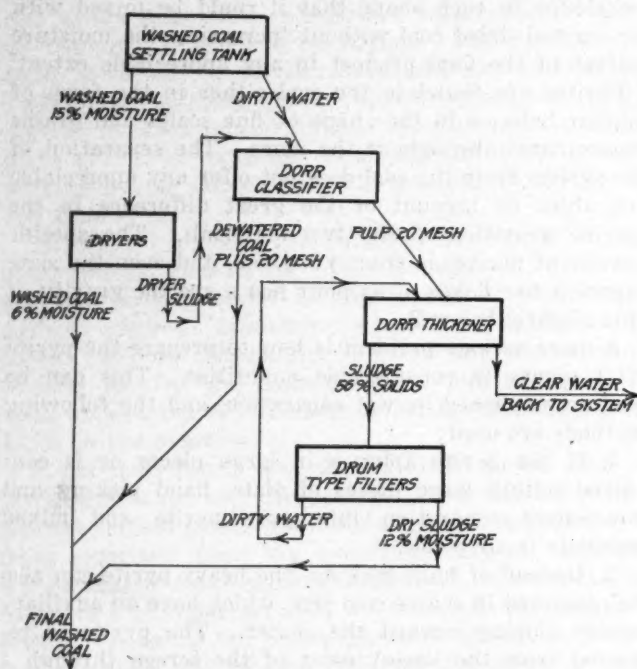


FIG. 23. TYPICAL LAYOUT FOR A CLARIFICATION AND RECOVERY PLANT

sume part of the work which the overloaded jigs cannot perform to the required degree of exactness. The table below will show what quantities of water are required in a washery. We assume a mine hoisting 3000 tons of coal per day and that 80 per cent. of this amount will be handled in the washery. The table shows the different sizes of the washed coal made and the required quantities of water. If the washery is de-

Size of Coal	Per-centage	Amount in Tons	Water Required in Gallons per Ton of Coal	Water Required in Gallons per Day
Lump coal.....	20	600		
Nut coal, 1/2 to 3 in.....	35	1,050	965	1,013,250
Fine coal, 1/4 to 1/2 in.....	30	900	1,440	1,296,000
Sludge 0 to 1/4 in.....	15	450	240	108,000
Fresh water for spraying nut coal..			24	25,200
Total.....	100	3,000		2,442,450

signed for a daily capacity of 200 tons—that is, for a 12-hour shift—the hourly water requirements are 203,537 gal. or 1017 gal. of water per ton of coal.

It thus becomes clear that only in extremely exceptional cases can the clarification and reuse of the wash water be neglected. Assuming the cost of water at only 0.005 of one cent per gallon (which means 20,000 gal. for \$1), the water alone would cost 5.09c. per ton of coal and the daily expenditure for a washery with an output of 2400 tons of coal would be \$122.16 for water alone. Therefore, every effort should be made to clarify and recirculate the water without appreciable wastage.

Water losses can be divided into unavoidable and

avoidable ones. Unavoidable ones are brought about by evaporation and by a certain amount of water being carried away with the washed coal, the refuse and the sludge. These losses are increased by any necessity for rapid operation, which gives little time for drainage. Only in the bins has the coal time to lose some of the water. With the installation of mechanical dryers, however, this loss has been greatly diminished as most of the water adhering to the coal is returned to the system. But there still remains the loss of water caused by the moisture in the outgoing refuse and sludge.

The loss of water that drains out of the bins is avoidable through collecting it in gutters. Avoidable also are the losses caused by leaky tanks and sluiceways. These losses increase with the age of the washery and can hardly be entirely eliminated. The use of steel, cast iron and concrete for tanks and sluiceways will cut down this loss considerably and will also make the whole plant a good deal cleaner. The idea that a washery must be sloppy is not only erroneous, but expensive.

The amount of the water losses varies widely with the construction of the washery, its age and the materials used in its construction. It is safe to assume such loss as amounting to from 8 to 10 per cent. of the total quantity used. This amount must be taken into consideration in figuring upon the necessary fresh-water supply. Whether these figures will be sufficient depends entirely upon the efficiency of the water-clarification plant.

If mine water which is acidulous or salty is used, greater quantities must be wasted so as not to increase the acidity of the water beyond a safe point. If concrete is largely used in the construction of tanks and sluiceways, care must be taken to keep the acidity of the water within close limits, as acid water has a disastrous effect upon concrete structures.

In general the degree of water clarification desirable depends upon the proportionate cost of power and water, the possibility of clarifying the water and of allowing the dirty water to run away without damaging adjoining property or polluting streams.

#### PUMPS AND CISTERNS USUALLY EMPLOYED

For water circulation in the washery centrifugal pumps are almost universally used. The character of the water, the requirement of lifting large volumes of water under comparatively low heads and the floor space at disposal forbidding large pumprooms, render centrifugal pumps especially advisable. It must be emphasized also that the whole washer operation depends upon the uninterrupted service of the circulating pumps; therefore, it would be mistaken economy to leave a spare circulating pump out of the washery equipment merely on account of lack of convenient space or a shortage of money.

The fact that water clarification is the final process places the pump cistern at the lowest point of the washery. It is important to make the pump cistern big enough to take care of all the water in circulation when the pumps are shut down and, on the other hand, to give the pumps sufficient water from which to draw at the beginning of the operation. It has been found advisable to interpose between the circulating pump and the jigs a water tank or high-level reservoir for the purpose of supplying the jigs with water under constant



pressure and at the same time to provide further storage space.

The power required for the circulating pumps varies considerably, depending upon the volume of water to be circulated and upon the difference in elevation between the pump cistern and the jig tanks. Approximately, it can be assumed that for a washer having a capacity of 100 tons per hour there are required 70 to 125 hp.; for 150 tons per hour, 100 to 150 hp.; for 200 tons per hour, 140 to 170 hp.; for 250 tons per hour, 160 to 250 hp. Besides the circulating pumps several other pumps are required to handle the sludge from the thickeners and the clear water and the sludge from the clearing basins. It is also advisable to install a high-pressure pump for fire protection and for the purpose of washing off the floors and washing down the accumulated dust from the roof trusses.

The amount of power required depends primarily upon the capacity of the washery. The following must be considered to determine the total amount of power required: The methods of operating the screens, the jigs, the dust collectors, the crushers, etc.; in short, all of the mechanically operated equipment. This in turn depends upon the character of the raw coal and its impurities. The power required for each piece of apparatus designed for a certain capacity and material is known; therefore, the summation of the power required for all the apparatus gives the total power necessary. To this total, however, must be added a certain percentage to take care of the power losses sustained in transmission.

Local conditions and arrangements of the machinery influence power consumption. To reduce the power requirements to a minimum it is desirable to either use the natural elevation or to raise the raw coal to such a height that the flow of the materials can be carried on by gravity alone or with the aid of sluicing water. In a level country there are some limitations to this ideal condition on account of the difficulty encountered in designing and operating heavy elevators of great capacity in an economical manner.

The power required per ton of coal treated will vary

between considerable limits. Average values taken from existing installations are given as from 2 to 3 hp. per ton of hourly capacity. Some modern installations, however, with a complete system of water clarification and sludge recovery, require as much as 5 hp. per ton of hourly capacity.

From the foregoing discussion it can easily be seen that only after a careful examination of all the details will it be possible to decide upon a suitable general arrangement. Furthermore, the cost of power plays an important part in the proper selection of the machinery. A mine paying only  $\frac{1}{2}$ ¢. per kilowatt-hour can consider in the selection of the machinery other advantages than a mine paying  $1\frac{1}{2}$  cents.

The following table gives the average power required for the different pieces of apparatus used:

Description of Apparatus	Power Required for a Washery Having a Capacity per Hour of		
	100	150	200
1. Dust collector in screen house.....	5 to 18	6 to 18	7 to 18
2. Screens in tipple.....	6 to 15	8 to 25	15 to 40
3. Picking tables and loading booms....	10 to 15	10 to 25	15 to 30
4. Conveying rock and picked-out slate.	6 to 15	6 to 15	6 to 15
5. Conveyors from screen to fine coal bin.....	5 to 10	6 to 12	8 to 15
6. Crushers.....	80 to 120	100 to 160	150 to 200
7. Raw coal elevator.....	15 to 30	20 to 50	30 to 60
8. Conveyors for raw coal storage bin...	5 to 10	5 to 12	5 to 15
9. Magnetic separator.....	5 to 10	5 to 10	7 to 15
10. Preliminary screens.....	5 to 10	7 to 15	10 to 20
11. Dust collector.....	5 to 10	5 to 15	6 to 05
12. Coarse coal jigs.....	15 to 25	20 to 40	40 to 52
13. Coarse refuse elevators.....	5 to 10	7 to 12	10 to 15
14. Rescreening of nut coal.....	5 to 8	5 to 12	7 to 15
15. Conveying nut coal to storage bins...	5 to 6	5 to 8	6 to 10
16. Conveying middle products.....	5 to 6	5 to 8	6 to 10
17. Crushing middle products.....	10 to 30	20 to 40	30 to 60
18. Rewash jigs.....	5 to 10	10 to 15	15 to 20
19. Fine coal jigs.....	10 to 15	15 to 20	20 to 30
20. Concentrating tables.....	7 to 12	10 to 15	15 to 20
21. Fine refuse elevators.....	2 to 5	3 to 6	5 to 8
22. Conveying fine coal to storage bins...	8 to 20	12 to 30	15 to 30
23. Drying of fine coal.....	60 to 100	100 to 150	150 to 200
24. Sludge recovery.....	5 to 10	10 to 15	15 to 20
25. Water circulation.....	70 to 125	100 to 150	140 to 175

(to be concluded)

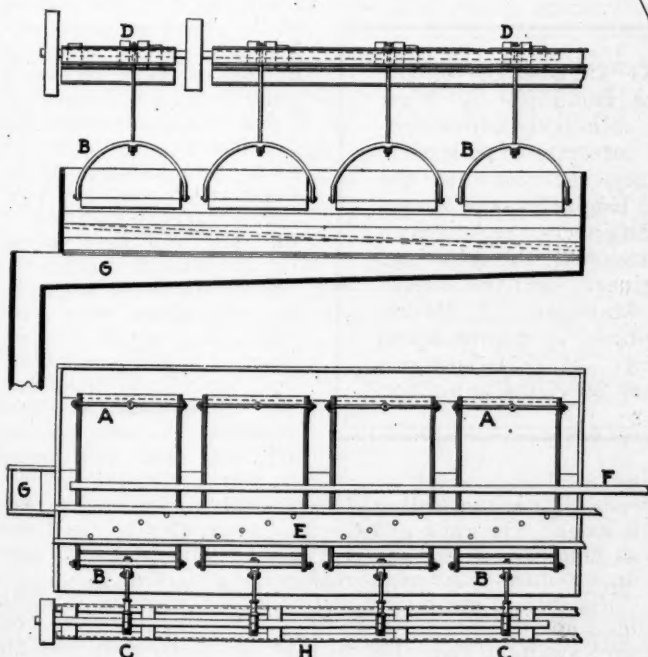
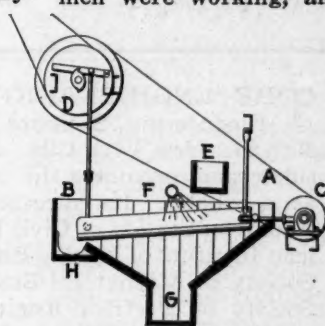
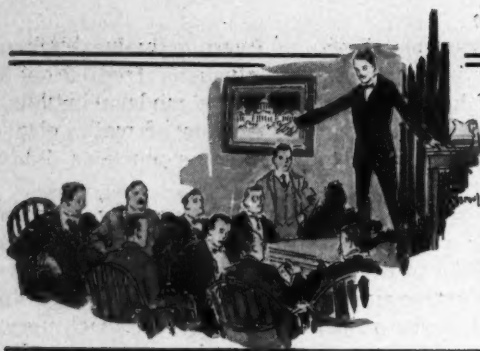


FIG. 24. KOHL-SIMON SCREEN USED IN SEPARATING COAL FROM SLUDGE



With the object of recovering living men within a mine after a disaster the first effort should be to ascertain, from a reliable source, in what parts of the mine men were working, and to locate those parts of the mine to which the men might go to get the best air. The rise and dip and the location of pillar work and wet places would be clearly shown on the mine map, as would the position of pumps. Any pumps driven by compressed air may make available a supply of fresh air. Presumably, entombed men will go to those parts that are naturally damp or wet or where compressed air machinery may be in use, and the first efforts of rescue should be directed to those districts of the mine in which there seems to be the greatest likelihood of finding men alive. If any parts of the mine have been liberating explosive gas, it may be presumed that the explosion originated in one of those. The report of the fireboss should be examined to ascertain in what sections of the mine he has previously found explosive gas. In the absence of such information, the exploration should be made first along those entries of the mine that show indications of least violence and heat. If men got out of the mine immediately or shortly after the explosion, an effort should be made to reach that part of the mine.



## WHAT THE ENGINEERING SOCIETIES ARE DOING

### Engineering Council Condemns Low Salaries

**Declares Compensation for Services Has Not Risen with Living Cost and Seeks a Classified Salary Schedule**

**R**EPORTING at the recent regular meeting of Engineering Council, the committee on classification and compensation of engineers presented the following analysis of the situation and suggested the lines of its future action. Reports from separate sections of the committee are also briefly abstracted herewith:

In attempting to formulate standard rates of compensation for professional engineers, the first task is to find what rates are actually in force, especially in those fields where attempts at standardization have been made. The second task is to inquire what adjustment should be made to correspond to the great change which has taken place in the cost of living, or, in other words, in the value of the dollar. How great this change has been during the past twenty years is realized by few. Fortunately, an accurate determination is available in the statistical records of average prices which for many years have been gathered and published by leading commercial organizations.

A record of average prices of the necessities of life kept by R. G. Dun & Co. shows that prices have increased continuously for 22 years. A certain quantity of staple necessities could have been purchased July 1, 1897, for \$72.45. By Jan. 1, 1905, the same quantity cost \$100.32. On Jan. 1, 1914, before the outbreak of the war, the cost had risen to \$124.53; May 1, 1917, to \$208.43, and Oct. 1, 1918, to the maximum of \$233.23. This enormous increase in prices of the necessities of life has been accompanied by an increase in wages, especially among workers organized in unions which had the power to compel attention to their demands. In the unskilled labor market the relations of supply and demand raised wages during the war to points in some cases exceeding the increase in the cost of living. No such increase has taken place in the compensation of salaried workers in the professions. It has been assumed that these workers, living in a different social environment, had a margin of compensation sufficient to enable them to meet the increased cost of living. This assumption is not justified by the facts. Where salaries have been increased during the past three years, there are few cases in which the increase has been at all commensurate with the increase in prices of the necessities of life, which the salaried worker, like the wage worker, has to purchase. That this is a correct statement is amply proved by many direct comparisons which

have been made of the wages of the workers in various skilled trades and the salaries of the rank and file of technical and professional workers.

There is little doubt that an unprejudiced investigation would show that a large proportion of the salaried workers in professional occupations during the past three years have been unable to pay their living expenses from their earnings and have been obliged to rely on income from property owned or to use up savings of other years in order to maintain themselves.

A serious question is whether the present scale of prices is here to stay. There has been a general belief that with the coming of peace and the resumption of productive industries a heavy fall would occur. It has been assumed that the salaried worker would have to wait for this so that he could again live within his income. It now appears, however, to be the opinion of many financiers and economists that the present high prices of necessities are likely to continue for a long time, probably for several years. The salary of \$2000 a year which a man received from 1902 to 1905 will now buy less than \$1000 worth of necessities. This has been the case for two years. If this is to continue for two, three or four years to come, then surely the salaried worker, in a professional or any other occupation, has an equitable claim to have his compensation brought back in purchasing power to where it was fifteen years ago.

There is another aspect of the compensation of the professional worker which has been frequently misunderstood, but which, with present knowledge, ought no longer to deceive. The pay of professional engineers has for many years been influenced by the idea that a young man in the earlier years of his work should expect moderate compensation because of the future to which he might look forward. In Great Britain this idea found expression for

many years in the custom of the young engineer paying a premium during a number of years' service in order to learn the business. There was justification for this idea during the period when the development of engineering was so rapid that a large proportion of the men who were turned out from the few engineering schools or the engineering workshops were able eventually to rise to positions of large responsibility and importance, commanding high salaries. That condition has been altered. Of the men who begin

technical engineering work today, only a very few selected ones can rise to positions of responsibility commanding high salaries. The rank and file must inevitably be ten times as numerous as the captains and lieutenants, and a hundred times as many as the majors and generals.

The man of exceptional ability, indeed, may find it worth his while to work for low compensation because of the future awaiting him. But to hold up to the rank and file of technical workers the idea that they can afford to work for insufficient salaries for the sake of some future high

**T**HE ENGINEERING COUNCIL, of the Engineering Societies Building, 29 West 39th St., New York City, is a body which considers and promotes the interests of engineers as a whole. Its member societies are the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, the American Society of Electrical Engineers, and the American Society for Testing Materials. J. Parker Channing, a mining engineer, is chairman and Alfred D. Flinn, secretary. M. O. Leighton is chairman of the National Service Committee.



position, which they have not one chance in twenty or fifty of attaining, is a gross deception.

The committee believes, therefore, that in adopting standards for the compensation of workers in all technical fields due consideration must be given to the great increase in the cost of living which has taken place. The dollar of salary must be considered with regard to what it will purchase today and is likely to purchase next year, and not with regard to the value of the dollar ten or fifteen years ago.

This increase in compensation is necessary not merely as a matter of justice to the engineer, but in order that engineering work may be maintained on the plane that it must be to secure economical and efficient work. Not only the leaders but the rank and file of technical workers often have it in their power largely to affect the cost of the work in their charge by the quality of the effort they exert.

There is no economy in paying such men at rates inadequate for their support, for this leaves their minds burdened with anxieties, when they should be free to give their best efforts to the work in hand. Moreover, such a rate automatically tends to drive the abler men into other occupations and to leave in charge of the work only those of less ability who are unable to make a change.

The municipal and state section of the committee, Arthur S. Tuttle, chairman, reported that it was formulating a standard classification of positions and duties, and a schedule of titles and qualifications has been prepared to be incorporated in a questionnaire for circulation among engineers of all states and the more important cities.

The Federal Government section, John C. Hoyt, chairman, reported that a survey of Government activities shows 28 offices that employ Government engineers. A letter was sent to each member of the Cabinet requesting a list of engineering bureaus in his department, and favorable responses were received from all except the Secretary of War.

The railroad section, Francis Lee Stuart, chairman, reported that a questionnaire had been prepared to be sent to the chief engineers of the railroads under Federal control, but after conference with Director General Hines it was decided to send it to members of the founder societies connected with railroads. A letter outlining the work of the committee and suggesting a simple general classification into eight groups accompanied the questionnaire. These eight groups of engineers are as follows:

- (1) Chief administrative officer having full charge of organization, including determination of policy;
- (2) head of major subdivision in responsible charge of large unit;
- (3) head of intermediate subdivision in responsible charge;
- (4) head of minor subdivision;
- (5) on general duty under direction but requiring special education and special training and the use of initiative and originality;
- (6) on subordinate duty requiring special education or training but not requiring special originality;
- (7) on subordinate duty not requiring special education, training nor originality;
- (8) on special duty of responsible character requiring particular qualifications and initiative.

### Interior Department Will Henceforth Be Headed by an Engineer

Far-reaching changes in the executive machinery of the Federal Government were proposed in the bills introduced in each house of Congress on June 25. The Federal Department of the Interior will become the De-

partment of Public Works, if the legislation proposed is enacted. The main idea is to assemble all engineering activities of the Government in one department.

Such bureaus of the Interior Department as are not of an engineering character are to be placed under the jurisdiction of the appropriate departments, while engineering bureaus from other departments are to be included in the Department of Public Works. The bill proposes that the Patent Office is to be removed from the Interior Department and placed under the Department of Commerce. The Bureau of Pensions is assigned to the Department of the Treasury. The Bureau of Education goes to the Labor Department. The Bureau of Indian Affairs also is transferred to the Department of Labor, with the proviso that the engineering and construction work and the land and mineral surveys now performed under the direction of the Bureau of Indian Affairs are to be prosecuted under the Department of Public Works. St. Elizabeth's Hospital and the Freedman's Hospital in Washington, D. C., are assigned to the Treasury Department. Columbia Institution for the Deaf and the Howard University go to the Bureau of Education, under the provisions of the bill.

On the other hand, the Department of Public Works is slated to absorb the Supervising Architect's Office of the Treasury Department; the Construction Division, River and Harbor Improvements, Mississippi River Commission, and California Débris Commission of the War Department; the Bureau of Standards and the Coast and Geodetic Survey of the Department of Commerce; the Bureau of Public Roads and the Forest Service of the Department of Agriculture.

The bill provides that the Secretary of Public Works "shall by training and experience be qualified to administer the affairs of the Department and to evaluate the technical principles and operations involved in the work thereof." The measure excepts from the foregoing provisions the Cabinet Officer who is the head of the Department at the time of the passage of the bill.

Four assistant secretaries, each to be paid \$7500 per annum, are provided and their duties outlined. One assistant secretary is to have administrative jurisdiction over all matters of engineering design and construction. Another is to have charge of architectural design and construction. The third is to have jurisdiction over all scientific work and surveys, while the fourth assistant secretary is to be in immediate charge of all land and legal matters. The assistant secretaries are charged with the duty of coördinating and bringing into efficient relationship all the activities of the department, so that it may be harmoniously and efficiently administered.

An important feature of the bill is the proviso that engineer officers of the United States Army detailed on non-military work are to be assigned by the Secretary of War to like duties under the new department, for not over two years. This enables the Secretary of Public Works to make gradual transfer of improvements and instrumentalities to civil administration without detriment to public interest. Members of the Corps of Engineers may, under the direction of the Secretary of Public Works, be detailed by the Secretary of War to temporary duty in the new department for such instruction, training and experience as is desired.

The bill was introduced in the upper House by Senator Wesley L. Jones of Washington, and in the lower House by Representative Frank C. Reavis of Nebraska.

# Proper and Lawful Examination of a Mine by the Mine Examiner\*

**The Mine Inspector or Examiner Should Be the Most Efficient Official About the Mine. The Law Prescribes What the Examiner Must Do While Making His Daily Inspection, But Does Not Restrict His Additional Activities in the Interest of Safety. An Inspection May Be Entirely Legal But Not Proper or Adequate**

BY STEVE GOSNELL  
Hallidayboro, Illinois

**"SAFETY FIRST"** has been the great slogan of all the leading industries of the United States for the last few years. Much has been written upon this subject and many safety devices invented for the protection of life and property. Many articles have appeared and are appearing in our leading mining journals relative to the efficiency of mine officials, and it is needless to intimate that these have not neglected the mine examiner.

If there is an official about the mine that should be efficient, it is the mine examiner, for upon him depends the safety of every man underground. Especially is this true in gaseous mines. Now let us apply "Safety First" in the examination of a mine, since such an examination cannot be "proper" except it be safe. Also note the distinction between "proper" and "lawful" examinations.

For example: The Illinois statutes permit the mine examiner to begin his examination eight hours before the men's entrance into the mine. Is this "proper" or "safe"?

I contend that it is not, for the reason that many things may and do happen within the space of eight hours. Sixty per cent. of the mines in southern Illinois generate explosive gas in dangerous quantities, and I am safe in saying that almost all of them employ a night shift which begins duty anywhere from 4 to 11 o'clock p.m. and retires as late as 7 o'clock a.m. The day shift going on duty at 6:30 o'clock a.m. permits the examiner to begin his examination at 10:30 o'clock p.m. the preceding day.

Suppose that several entries generate explosive gas in dangerous quantities, which, of course, is taken care of by ventilation: Upon beginning his duties, the examiner proceeds to examine certain sections of the mine, finds everything in good order and ready for work; but after his departure some members of the night shift have business in this particular section, and upon leaving it carelessly leave a trapdoor open, short-circuiting the air current. This door stands open somewhere from two to six hours, or until the day shift goes on duty. The entries fill up with gas, the mine manager has no report of this gas until the miners working in this section arrive at their working place, and, with their open lights ignite it. He then gets the report that an explosion has occurred and 2, 6, 10 or maybe 100 men are burned or killed.

Now this examination was conducted strictly according to the Illinois mining laws, but was it proper or safe? True, the law gives the state inspector of mines

the authority to require in writing the addition of other examiners for the purpose of examining the mine, in shorter periods, but this also possesses a disadvantage, as there are few examiners that will go to the trouble of enforcing the law.

The mine examiner is required by law to see that the air is traveling in its proper course and in proper quantity; and to measure with an anemometer the amount of air passing the last crosscut or breakthrough of each pair of entries, or in the last room of each division in longwall mines, and at all other points where he may deem it necessary; and to note the result of each measurement in the mine examiner's book kept for that purpose.

He must inspect all places where men are required in the performance of their duty to pass or to work, and must observe whether there are any recent falls or dangerous roof or accumulations of gas or dangerous conditions in rooms or roadways; examine especially all roadways leading to escapement shafts or other openings for the safe exit of men to the surface, the edges and accessible parts of recent falls, old gobbs and air courses. As evidence of his examination of rooms and roadways, he must inscribe in some suitable place on the walls of each, with chalk, the month and day of the month of his visit.

When working places are discovered in which there are recent falls or dangerous roof or any other dangerous conditions, he is to place a conspicuous mark or sign thereat as notice to all to keep out; and in case of an accumulation of gas, to place at least two conspicuous obstructions across the roadway not less than 20 ft. apart, one of which shall be outside the last open crosscut.

Upon completing his examination he is required to make a daily record thereof in a book kept for that purpose, for the information of the company, the inspector and all other persons interested; and this record is completed each morning before the miners are permitted to enter the mine.

He is required to take into his possession the entrance checks of all men whose working places have been shown by his examination and record to be dangerous, and to give such entrance checks to the mine manager before the men are permitted to enter the mine in the morning.

This, if carried out, constitutes a lawful examination; but to properly and safely examine a mine, the mine examiner or examiners should begin their inspection not more than three hours before the men's entrance into the mine, and then only when all other persons are out except it be men employed near the shaft bottom

\*Paper presented before the spring meeting of the Illinois Mining Institute.



whose duties do not take them off the main entry or through trapdoors.

Each examiner should be allotted a certain territory, an amount that will permit him to make a thorough examination and close observation of all conditions under his jurisdiction. Upon his arrival at the mine he should see that the engineer and fireman, if such are employed, are on duty and that the fan is running at proper speed.

A dusty condition of the mine should also be observed by the examiner. This factor alone is highly dangerous in the presence of gas, or where shots are fired with black powder.

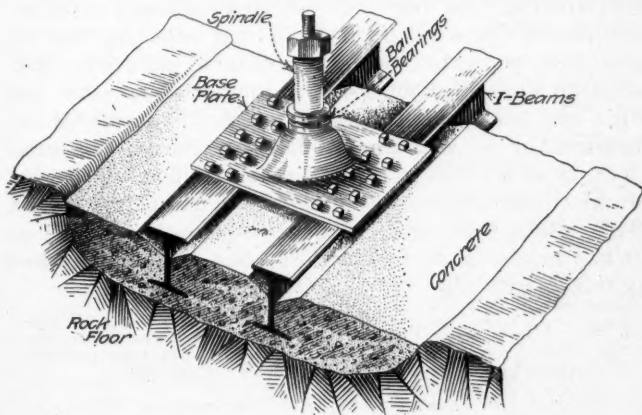
Dirty haulage roads, and poor and improper timbering are other dangerous conditions that should receive the strict attention of the examiner. He should not only mark working places as evidence of his examination, but should mark all trapdoors and regulators which are used for guiding the air current.

When places are found in either new or old workings in which an accumulation of gas exists, this should at once be removed by a special curtain or brattice erected under direction of the mine examiner before the men are permitted to enter the mine for the day.

### Anchoring the Bullwheel of 3500-Horsepower Haulage

BY RALPH W. MAYER  
California, Pennsylvania

A MINE with an output of 7000 tons of coal a day uses a 3500-hp. engine to drive its rope haulage. A 1½-in. cable is employed. The trip consists of from 120 to 150 cars, holding from three to four tons each, making a load of from 400 to 500 tons of coal in each trip exclusive of the weight of the cars. A single track is used, except at the turnouts and partings. It is necessary that the bullwheel be set so that neither it nor the



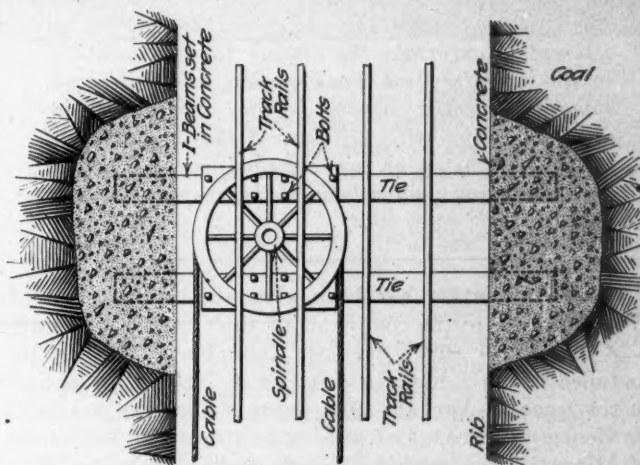
METHOD OF CONSTRUCTING ANCHORAGE

rope shall interfere with the motor haulage which delivers the cars to the rope-haul parting.

This object is accomplished by anchoring the bullwheel underneath the rails. Placed in this position, it would carry away possibly several miles of track and delay the operation of the mine for an indefinite period, if it should pull loose. This contingency is guarded against by anchoring the bullwheel so that it is practically impossible for it to pull out.

The anchorage is constructed as follows: Heavy 16-in. I-beams, about 3 ft. centers, are placed across the

parting, underneath the rails of both the tracks, and set into hitches cut into the rib for a distance of 6 ft. or more. The bottom is also taken up and the beams let down into the floor, so that the top of the bullwheel is below the bottom of the track ties. When the beams had been put into place the hitches in the rib were filled with concrete, as was also the space excavated in the floor. Underneath the wheel the concrete is only brought up level with the top of the beams. A pit with concrete walls made considerably larger than the wheel



DETAILS OF BULLWHEEL ANCHORAGE

was formed so that the wheel might be removed from underneath the track without disturbing the rails. The ends of the beams are covered over level with the top of the floor. A baseplate 3 ft. square and two or more inches thick is bolted to the I-beams. The bolts pass through holes on both sides of the beam web and through corresponding holes in the baseplate. Thus four rows of bolts across the plate hold it fast to the beams. Underneath the plate the concrete is not brought up to the top of the beams, a space of 6 or 8 in. being left unfilled so that the bolts may be passed easily up through the holes in the beams and plate.

A short pedestal in the center of the plate supports the spindle, which has a thread and nut on its upper end for holding the wheel down. The entire weight of the wheel rests upon the top of the pedestal and ball bearings are here located, upon which the wheel revolves. The spindle receives the pulling stress of the cable. The baseplate, pedestal and spindle are cast integral and an extra piece is kept on hand at all times to replace the one in use should it become worn out or unsafe. The bullwheel is 7 ft. in diameter.

No ties are placed under the rails over the bullwheel pit as the rails are of 90 lb. steel and amply strong enough to support the load passing over them. Plates of ½-in. steel cover the wheel pit. Each plate is long enough to extend the full width of the pit. They are cut so that they fit snugly between the rails and thus keep the dirt out of the pit. Although a car seldom gets off the track over the pit, the plates are sufficiently strong to carry the weight of a derailed car. Directly over the top of the wheel spindle a hole is cut through the plate for oiling the bullwheel. When not in use this hole is covered by a small plate a little larger than the hole. This is fastened to the larger plate by means of a rivet, which acts as a pivot, so that the small plate may be swung back to uncover the hole when oiling is necessary.

# Effect of Breaking of Coal on the Emission of Gas

BY ROBERT DUNN  
Victoria, B. C.

**SYNOPSIS**—*What effect has the bringing down of coal upon the emission of gas? The attempt to ascertain the answer to this question in the Crow's Nest Pass region has developed some unexpected results. Daily sampling and analysis of the mine air showed that the amount of gas in the mine air changed but little and seemed to bear no relation whatever to mining operations.*

SOME attention has been given in the columns of *Coal Age* to the coal fields of the Crow's Nest Pass District, Eastern British Columbia. The special instance which I have in mind is an article appearing in the issue of Apr. 10, 1919, being a digest of a report by George S. Rice, chief mining engineer, U. S. Bureau of Mines, on the subject "Bumps and Outbursts of Gas in the Mines of the Crow's Nest Pass Coal Field." In view of this interesting account of Mr. Rice's investigation and conclusions, it seems apropos to give some account of work that since has been carried on under the direction of George Wilkinson, chief inspector of mines for British Columbia, in connection with the mines of this district with particular reference to the flow of gas.

Mr. Wilkinson set out to ascertain what bearing the breaking of coal has on gas emission. The evidence accumulated indicates that, while it has some effect, its extent is not important. The coal of the Coal Creek mines, the chief producers of the section under discussion, is saturated with gas as a sponge may be with water, and is bleeding it constantly. This being the condition, Mr. Wilkinson's conclusion is that the best method of keeping the percentage down to well within the safety zone is to provide ample ventilation. More splits than usual are considered necessary with a comparatively small number of working places in each split. This is his theory of the operating policy which must be adopted in order that the percentage of methane shall be kept down to the minimum.

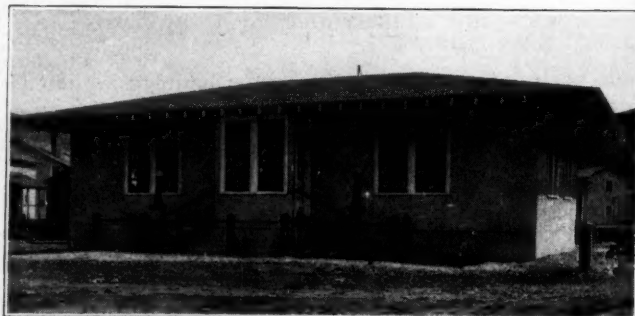
It is unnecessary, perhaps, to say that this course has been followed throughout the district. Furthermore, the Coal Mines Regulation Act now provides that the withdrawal point not only in these but in all mines of the province shall be 2.5 per cent., so that when the percentage of methane in any working place is found to equal or exceed this figure the law insists on the immediate removal of the miners. It has been established that a  $\frac{1}{4}$ -in. gas cap in the Coal Creek mines equals the 2.5 percentage of gas fixed as the point at which the men must be withdrawn. This was learned by measuring flame caps and comparing them with percentages of samples of mine air taken at the same time and analyzed. It may be stated incidentally that a  $\frac{1}{4}$ -in. gas cap in the Crowsnest region represents a greater percentage of gas than does the same cap in the mines of Vancouver Island.

To return to the matter of gas flow, there have been taken and analyzed 380 samples of the mine air in the Coal Creek mines by officials of the Department of Mines since Dec. 15, 1916, which date coincides with that of Mr. Rice's visit to the Crowsnest district. From the records thus secured, one of the objects of which was to ascertain the relationship between the gas flow and the working of the mines, it is possible to show quite conclusively that the coal beds give off just about the same amount of gas at all times. This interesting investigation, it may be explained, has been facilitated by the fact that there have been periods when the mines have been idle through strikes and for other reasons. The daily taking of samples continued without interruption and consequently some rather striking figures having to do with this point can be quoted.

Taking No. 1 East Mine, Coal Creek, south side split, for the first illustration, a sample was secured after the mine had been idle for 45 hours that showed 1.82 per cent. methane. Another sample taken after the mine had been idle for 30 days showed 1.52 per cent., or a decrease of only 0.3 per cent. after 28 days of inactivity. Another sample taken after the mine had been in operation for nine days showed 1.66 per cent. or an increase of only 0.14 per cent.

Other figures relating to the main return airway, No. 1 South Mine, Coal Creek, are interesting in this connection since they indicate that there was an increase in the amount of gas given off during an idle period. A sample taken after the mine had been inactive for 10 days showed 1.24 per cent. of methane, and another, obtained 31 days after the men had been withdrawn, gave 1.46 per cent., or an increase of 0.22 per cent. after 20 days of idleness. A sample taken after the mine had been idle 19 days showed 1.62 per cent. of methane, or an increase of 0.38 per cent. The same quantity of air was in circulation throughout the period of this investigation. Samples taken from No. 1 East Mine, south side split, to demonstrate the change as to gas emission during the working periods, resulted as follows:

9 a. m. ....	2.02 per cent. methane
9 p. m. ....	2.20 per cent. methane
7 a. m. ....	2.08 per cent. methane
Maximum change during period of breaking coal 0.08 per cent.	



NEW MINE DEPARTMENT BUILDING OF RALEIGH COAL AND COKE CO., AT RALEIGH, W. VA.



## NEWS FROM

## THE CAPITOL

BY PAUL

WOOTON



### George S. Rice Returns from Interesting Tour of European Coal Fields

THE French are showing engineering ability second to none in the rehabilitation of their coal mines, according to George S. Rice, the chief mining engineer of the Bureau of Mines, who recently returned from a personal survey of the coal situation in France, Belgium, Germany and England. The reclaiming of the French mines, however, is being delayed by the French governmental policy, which Mr. Rice does not undertake to criticize. The policy to which he refers is that of opposing the purchase of foreign mining machinery owing to the overwhelming balance of trade against France.

In Great Britain, Mr. Rice found that the financial interests are frankly calculating the effects of a total discontinuance of coal exports from England proper. Apparently, England needs all the coal she can produce. It is evident that present restrictions on local consumption of coal can not be continued indefinitely. Mr. Rice found powerful influences at work tending toward the nationalization of coal mines. Mr. Rice gained the impression, however, that the opinion of the majority of the people is that the time is not ripe for the nationalization of the coal industry. That sentiment, however, may not have crystallized to the point where it may be effective in preventing such a step.

Mr. Rice went to Europe several months ago at the head of a Bureau of Mines commission. He now is engaged in writing a report on the great deficiency in the fuel supply of Europe. He also will reduce to a report other observations and conclusions that he reached as a result of this trip. In a running story of his survey, Mr. Rice says:

On our arrival in Paris, thanks to Professor Probert, our itinerary was practically arranged. Through the kindness of Secretary Baker, a military automobile was placed at our disposal. This greatly facilitated our movements in a territory where ordinary means of transportation are partially disrupted. We visited first the Lorraine iron mines. Then we went to the French steel plants which had been destroyed by the Germans. We visited the mining areas of Luxemburg and those in the vicinity of Metz, after which we went through the Saar coal fields where we saw the German miners working under French military control, helping to supply, in part, the loss of production in the Pas de Calais field. We then returned to Paris via Verdun where we had the honor of spending the night in the citadel as the guest of the commandant. We had an opportunity to go over the whole battle area on which occurred the most intense conflict in the whole history of clashing arms.

On our return to Paris, Dr. Cottrell left us to visit the air-fixation plants in Germany. Professor Probert and I went to the Pas de Calais coal field. In addition to ex-

amining the mines which had been willfully destroyed, we made interesting observations at the principal French mines which escaped that fate. These mines continued in operation during long periods when they were under shell fire. Professor Probert then returned to the United States. I was requested to take part in an advisory capacity on coal matters in an Allied conference with German representatives at Cologne. The object of the conference was to obtain information as to what Germany had to offer in exchange for foodstuffs. As France and Italy each was in great need of coal and coke, it was hoped that Germany might have a surplus of these fuels. It proved that Germany had no coal or coke from the Westphalian field to offer, other than that already going to the occupied territory on the west bank of the Rhine. Strikes and labor difficulties, ascribed partially to food shortage, had cut down the output. It was at this conference that the Germans complained that the French had made no accounting to them of the coal taken from the Saar valley. Major-General Gaillard, who presided, merely smiled and did not call attention to the fact that they also had received no bill for the damage done French coal mines. The bearing of the Germans on that occasion was not that of those who recognize military defeat.

While waiting for the conference to convene, I had time to visit the mines on the west bank of the Rhine in the Westphalian field and the remarkable brown coal field near Cologne. On the return from Cologne I visited the mining region of Belgium from one end to the other—from Liege to Mons—and thence continued over the line into the devastated mining region as far as Lens.

I was detained in Paris by some matters pertaining to the Economic Commission's work, but as soon as I could get away I went to the south of France to visit the St. Etienne, Marseilles and Alias coal fields. I was interested particularly in the latter where there are great outbursts of nearly pure carbonic acid gas which appears to be held under very high compression in the coal.

I then went to England, where I visited the typical iron mines in the Cleveland and Cumberland districts; the oil shale workings in Scotland, and various collieries.

### Fuel Administration Winding Up Affairs

While the Fuel Administration passed out of existence June 30, the Labor Bureau will be continued during the life of the Washington wage agreement. Congress has been asked and doubtless will furnish \$50,000 to keep this bureau alive since there are certain negotiations which must be continued as the Fuel Administration is a party to the agreement which continues until peace is signed. In addition, the business office will require a few weeks to close up the books and records. The final report of the statistical division is now in the hands of the printer. C. E. Leshner, who has been in charge of that division, now will devote his entire time to the mineral fuel section of the Geological Survey, of which he is head.

# COAL AGE

Volume 16—July 3, 1919—Number 1

PUBLISHED BY MCGRAW-HILL COMPANY, INC.,  
10TH AVE. AT 36TH ST., NEW YORK

Address all communications to COAL AGE

## Always Need for Skill in Mine Work

AT no time has mining work been without its tricks requiring a degree of practiced skill. Yet it is a question whether the modern methods make any more demand on the trained ability of the worker than those which preceded them. The main difference lies rather in the fact that present-day methods are new and constantly changing. If it were not for our multiplicity of booklets and our machinery demonstrators, we should be at a loss to handle our new equipment.

To illustrate with a few simple examples, the miner's torch was provided with a wick by the miners at no little expense of ingenuity and patience. To form one, to blow in the leading strand, to pull the wick into place without matting the cotton, to make it just tight enough and not too tight, long enough and not too long, to burn off the bunched ends, to regulate the length of the exposed wick by a deft blow below the spout or on the bottom, to keep the lamp burning in a draft—these were a few of the tricks which a college graduate in mining found at first a little perplexing. For quite a while after his first initiation, he was obliged to leave the manipulation in the hands of his foresight man or defer a good deal to his advice.

At some mines the paraffin-wax lamp was introduced and was a cause of no little puzzlement. It was always too hot or too cold. The novice held it too long over the blacksmith's fire and melted the solder, or, if that did not result, it got so hot he could not hold it and the grease would run out of the spout in a steady stream. Again the lamp would get too cold and the wax would harden and gum the wick, and when the flame burned low the wax would completely congeal and cease to flow, thus putting out the light.

Then came the acetylene lamp. It had difficulties all its own but none more trying than those with the old oil torch. How difficult they were at first! How long the first carbide users struggled with the feed regulation and the cleaning of the burner! There were difficulties innumerable, not so much because the operation was hard, but because the technique was new.

The electric lamp is the simplest of all for the user though there is something to learn about protecting it from breakage and injury. Nor is the work in the lamphouse of any great complexity. The old safety lamp required probably just as much or more skill from the lampman and his assistants.

And again, driving a mule was always more of an accomplishment than running a mine locomotive, but a certain amount of the ability was attained so early by boys who played around the mines or trapped at the doors, or by farmer boys who learned the art of judiciously handling such animals in their fathers' barns, that it never appeared that there was much of art in its exercise, and the knowledge seemed so innate as to be really hereditary.

Taking care of mules in a stable, feeding them rightly,

tending their wounds intelligently and dosing them prudently was a more difficult task than the charging of storage batteries. But information was available everywhere. It was not always correct information, but there was a lot of it. You could get it at any crossroads grocery, and farmers discoursed at length on the subject with the passers-by, giving dates and other details of painful experiences of their own.

But about the storage battery, while much needs to be known, it is all simple enough to learn. What makes it perplexing is that it is new. It has to be acquired all at once and not in the space of years, and the information must come from only one or two; and instruction cannot, like mule lore or mine-pick learning, be obtained from all the wiseacres of the neighborhood. With something that is new, one holds oneself absolved if a mistake is made. But with old, well-tried instruments one cannot dismiss obligation nor avoid being laughed at when something goes wrong. That is why when a tool is well established every one is willing to do his utmost to use it with maximum efficiency.

No, mining is hardly more difficult now than before, but because the art is new and changing and because we need more technical excellence than ever before, we need good schools for all classes of mine employees.

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*Foreign trade is still looked upon as a means of dumping excess product on the foreigner—a spot trade to start as soon as the domestic trade lags and cease as soon as domestic trade recovers—but business of that kind is successful only in peculiar emergencies. To do a large business and do it profitably it must be of a permanent character and pursued unremittingly regardless of trade conditions.*

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## Face the Worst First

EVERY man should be placed, as far as possible, so that he will do that work for which he has aptitude and liking. But unfortunately it is not possible, nor is it always efficient even where possible, to have such a division of labor, mental or physical, that a man will always be doing that for which he has a natural penchant or an inborn ability.

But every man can, when new needs arise, develop new qualities to meet them; and sometimes it is only a lack of opportunity that has prevented a real aptitude from making its appearance. Some men, for instance, shrink from interviews, pleasant or unpleasant; some will even swoon when making a speech; but after a little experience, either of these demands on their fortitude will rouse in them their sporting blood, and they will find a joy in meeting criticism with a deft diplomacy and in changing by a brilliant speech the points of view of a large audience.

When a man is confronted with a necessity making an undue drain on his courage, perseverance and comfort he should put this unpleasant duty first. "Face the worst first" is a good maxim. Many a business has been spoiled because the executive feared to tackle his bitterest task. Many a bright man has failed because he left unpleasant matters till after he had exhausted all the labors that seemed to him pleasant. Many an industrious man who worked far into the night on some congenial task, congenial perhaps only to him, thought it strange that his work was not recog-



nized. But he could never succeed because he left the most important work day by day to do work that suited his peculiar temperament or tried perhaps to do his work in a way he had followed before and one that pleased him, rather than in the best and least laborious way.

Many are the idiosyncracies of humanity. Some men who can no longer learn must have those idiosyncracies protected; others who can learn should be spurred and led by the bridle till they can overcome their unnatural fears. But the man who shies at the worst tasks will never be a good executive. In the unpleasant occasions of life often lie our easiest and greatest of opportunities when once we try them.

Most of us have so much to do and such little time to do it in that we can coax ourselves into the belief that we are doing our whole duty when we let the multiplicity of pleasant jobs fill up our time to the exclusion of the less pleasant. However, let us not deceive ourselves; we are never so busy that we can delay action on large matters to spend our time on more trivial issues.

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*The nation's most prized possession is not its wealth but its smile. It is the incarnation of its hope, the symbol of its optimism and the warranty of its democracy. Our smiles are the springs by which we cushion the blows and jars to which we are exposed. Only with humor and a smile can we measure up the workaday world with sanity and meet its trials with composure.*

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### Cost of Mine Supplies

THE increasing difficulties that the hard-coal mines are facing are seen in the higher costs for supplies and materials necessary in the mining operations in that field. For instance, in 1909 the anthracite companies expended over 23 million dollars for supplies as compared with 40 million dollars spent in the bituminous field, where four or five times as much coal was produced. The percentage of gross expenditures for supplies by the hard coalers amounted to 19 as compared with 12 in the bituminous field.

Expenditures for supplies vary over a wide range, this being frequently due, no doubt, to the personal equation of the one compiling the statistics, though there are exceptions even to this. For instance, in one case where a mine official carefully estimated the cost of supplies at three different operations, it was found that these vary from 7c. to 20c. per ton of coal mined. The low cost was naturally obtained under favorable conditions where the mining was at relatively shallow depths, while the high costs represented unfavorable conditions such as deep shafts, large amounts of water to handle, pitching coal (resulting in difficult haulage) and gassy conditions.

The distribution of the cost of material and supplies, according to the leading coal-producing states as given in the United States census reports for 1909, showed variations of from 8c. to 29c. per ton. The State of Indiana showed the lowest. Kansas was second, with 9c. per ton, and Illinois and Ohio both 10c. per ton. Kentucky and West Virginia both showed a cost for supplies and material of 11c. per ton. Oklahoma pays substantially the highest price for her supplies and materials, the figure given being 29c. per ton, the nearest approach to this being the State of Iowa with 17c. per ton. While Oklahoma shows this unusual cost for ma-

terials and supplies on the basis of cost per ton, the discrepancy is materially reduced when computed on the percentage of costs to revenue. Figured on this basis, Oklahoma still stands at the head of the list with 14½ per cent., but West Virginia is a close second with 13 per cent.

The matter of cost of materials is one that will justify the closest attention of the operator. It is extremely difficult to provide any adequate check on mining supplies, particularly those used underground, where they are liable to be misplaced and eventually lost. The resumption of more normal conditions in the coal industry with the return of the old competitive basis of operation will make it necessary to follow up the question of costs carefully once more, and the mine manager will find this a profitable field for his attention.

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*A man may regard as his proper wage just what he can get, or he can regard it as what he is justified in getting. If it is the first then no mercy can be shown him. He must accept reductions under duress in the same measure with which he imposes advances. If he believes there is a fair wage which he is entitled to, he should not strike to obtain more, even when the industrial conditions wholly favor a demand of that sort.*

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### Increased Efficiency in Mechanical Equipment

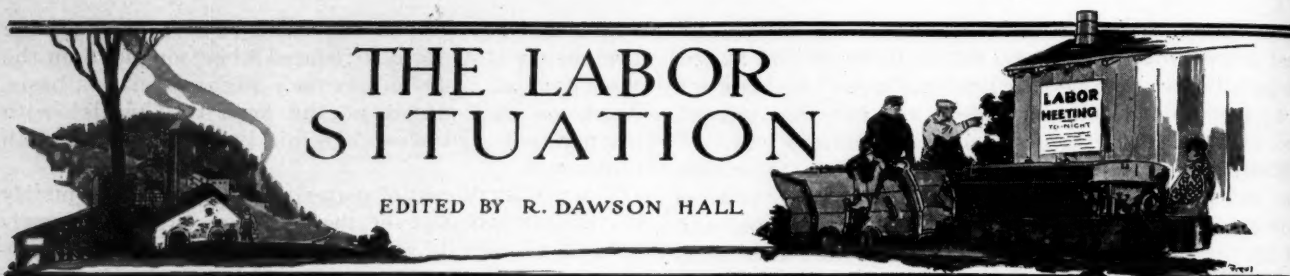
A CLOSE scrutiny of statistical data discloses some interesting features on the increased efficiency and broader application of mechanical equipment to the production of coal. Thus it is interesting to note that the Pennsylvania bituminous production, while showing an increase of nearly 28 million tons during the 1910-1916 period, had at the same time a substantial decrease in the boiler power used.

The total number of boilers in the bituminous field declined from 3200 in 1910 to 2731 in 1916, indicating the adoption of higher powered units and the more general use of the private central station, though the purchase of power may also have been something of a factor in this connection.

The decline in the total horsepower of from 454,846 in 1910 to 441,067 in 1916—in view of the substantially increased output during the same period—indicates a wholesome improvement in the efficiency of the engine and power equipment generally employed around the mines; especially is this obvious when it is remembered that the increased mining depths have caused longer hauls and more difficult ventilating and pumping problems during this time.

A still more significant figure, perhaps, is the marked increase in the tonnage produced per boiler in use. The tons produced per boiler increased from 46,180 in 1910 to 61,950 in 1916. The tonnage produced per boiler-horsepower also shows a wholesome increase from 327 tons in 1910 to 384 in 1916.

The conclusions to be drawn from these figures are obvious. The progressive operator is looking carefully into the mechanical equipment of his colliery. He is raising the standard in this direction and demanding the best and most economical apparatus that the market affords. And the extraordinary advance in wage scales of the past year or two will give new impetus to this movement.



## General Labor Review

Never was there any question as to the attitude of the Sankey Commission in Great Britain in regard to the nationalization of coal mines. It was a picked body as far as the representatives of the public were concerned. It was chosen to advocate certain measures, and it advocated them. What else could be expected of such men as Sidney Webb and Sir Leo Chiozza Money than that they would advocate nationalization of mines and of every other kind of public utility, the disposal of which might be entrusted to their judgment. The fact that the latter is knighted does not make it unnatural, with present-day conditions in England, that he should hold extremely radical points of view. Sir Leo Chiozza Money is an author and journalist. He was a Liberal and Collectivist in the House of Commons, where he sat for North Paddington and Northants. He has written much on physical and social problems. He doubtless received his honors because of the support he gave to his political party.

With such men representing the public, the Commission's radical report was to be expected, but it appears that Great Britain is by no means ready for the nationalization of mines. The press seems to be a unit in deploring the kind of report which the Royal Commission has brought in, and it is quite generally thought that the government will pay little attention to the recommendations which have been submitted to it. The commission was appointed at a time of panic, when the threat of the miners to paralyze the country caused everybody the utmost apprehension. A representative of the owners has put the case very accurately as follows:

### REPORT AN EXPRESSION OF FEAR, NOT OPINION

"The Sankey Commission was conceived in apprehension, and the Sankey report was born in fear. If we allow fear of the miners' leaders to rule our actions now we only postpone the evil day of reckoning. The great question is, will the miners wreck the country if we insist on sound reforms and refuse panic-stricken palliatives. I firmly believe they will not. Smillie and his fellow-extremists have their following among miners, but they do not rightly represent them. Smillie's own election as leader was a hole-and-corner affair, in which the majority of the local miners took no interest. The problem is one of leadership. The miners as a class are not revolutionists, and they can be led for good as well as for evil. If Smillie does represent the miners we may as well fight him now as later, and we can rely on the more democratic trade unions as well as on the bulk of the working classes who as consumers know what the miners' policy means. If on the other hand Smillie does not represent the miners then let us not be intimidated by him into doing things we know are bad, but rather press on reforms which are sound, and rely on the good sense of the miners to support the forces of reform and order."

There is very little question that something more or less radical will be done, but it is hardly likely that it will reach anything approaching nationalization or confiscation of mines. There is a possibility that a curb may be placed on the large royalty payments now being made to owners of coal lands, because no initiative or ability is required of those who ask for large returns on inherited property and who have, by reason of its limited quantity, a chance to secure whatever recompense they desire. It is altogether different with those who are actually producing coal. The work is one which requires ability of a high order and

much confining labor. It is realized that the men who produce coal are conferring a benefit on the people, whereas those who merely ask for a big royalty for coal in the ground are simply performing a disservice to the public.

The treatment of the Government bill for the regulation of British railroads has been treated almost contemptuously by the House of Commons. Pages of Sir Eric Geddes' measure for the purchase of any railway, tramway, canal or lock have been bodily removed. Parliament has showed itself strongly against the nationalization of railroads and it is likely that it will not view the nationalization of coal mines in any different way.

### TO TAX LABOR OF CHILDREN \$2 PER DAY

With the purpose of bringing an end to child labor in the United States, Representative Mason of Illinois has introduced a bill (H.R. 2251) under the provisions of which a tax of \$2 will be levied on children under 14 years who are employed in factories, and the same amount for children under 16 years whose work is performed in mines and quarries. This tax will be a per diem tax for each child so employed.

It would appear unfortunate for the country at large that a difference should be made between the age at which children can be employed in factories and mines. Every thinking man will appreciate that children should not be allowed to go to work before they are 14 years of age. When they are that age they should be allowed to enter any place of work they may elect. The bill which Mr. Mason presents will practically tend to deplete the coal industry by causing the children when they leave school to enter factories instead of mines.

Those of us who have studied the effects of industry on humankind know that there are certain specific diseases resulting from many kinds of factory work, whereas it is gradually being recognized that there is nothing approaching a mine disease, unless it be ankylostomiasis, of which the shallow coal mines of the United States are entirely free. In fact it may be safely said that ankylostomiasis is a surface disease, and that the health of mine workers is more secure when working in the mines than it would be when toiling on the surface.

### WOULD RATHER FORBID CHILD LABOR ALTOGETHER

At the last Congress, said Mr. Mason in his statement, a law was passed prohibiting all shipping of goods made by child labor from one state to another. The Supreme Court set aside this law by a majority of one, holding that Congress had no right to regulate interstate commerce in goods made by child labor. I offered no amendment, when a change in the constitution which would empower it to pass such an act was presented in Congress. In the meantime I propose, as a present measure, a tax of \$2 a day, to be paid by the employer, when children under 14 years of age are employed in factories, or when children under 16 are engaged to work in quarries or mines. I believe the Supreme Court would sustain such a law.

"The states in the north prohibit child labor while several of the southern states are employing young children in their factories. This gives the southern states an unfair advantage from a manufacturer's standpoint. But to correct that inequality is not the main purpose of the bill. What we want to do is to protect the children of the country. I believe it is a great national crime to put the children in shops and factories, thus dwarfing their minds and bodies. It has, moreover, a tendency to debase the quality of our citizenship."



A meeting of the executive board of the three anthracite districts of the United Mine Workers was held at Wilkes-Barre on Thursday, June 26, to decide on the place where the next tridistrict convention is to be held. The convention will frame up new demands on the operators which the mine workers hope to obtain at the expiration of the present agreement, Apr. 1, 1920. They are evidently looking quite far ahead, and to exhibit how forehanded they are, Aug. 19 has been tentatively set as the date for the convention. The miners feel that they have everything in their own hands, seeing that experienced miners are extremely hard to get and the demand for coal is pressing. It is said that quite a number of miners who left for munition plants have not returned.

#### MINE WORKERS GETTING READY TO MAKE DEMANDS

Those who believe themselves well posted regarding the labor situation in the anthracite region are disposed to think that the 7-hr. day will be demanded with the present rate of pay, but it is certain that, whether this is so or not, recognition of the Mine Workers' Union by means of the check-off will be demanded. If the shorter day is definitely shelved then wage increases will doubtless be looked for. The miners feel that they have poor arguments to advance for a shorter day, in view of the fact that the force engaged in the anthracite region at the present time is not able to supply the demand which the public is making upon the anthracite operations.

It is stated that, at a conference held during the second week of the month at Cincinnati, an agreement was reached, between officials of the Solvay Coal Co. on the one hand and President F. C. Keeney and Secretary Fred Mooney, of District 17, United Mine Workers, on the other as to the organization of the mines of the company at Kingston and Kiefertown, Fayette County, W. Va.

For some time the Mine Workers' representatives have been engaged in an effort to organize the mines in question. An agreement having been reached a formal contract governing mines, etc., will become effective shortly. Finishing touches will be put on the work of completing the organization of locals at the two mines mentioned, by duly constituted organizers.

No wage and working-conditions agreement was made at the preliminary conference held in Atlantic City during the third week of June as to the wage scale which would prevail in the New River district when the ratification of the peace treaty terminates the wage contract and the general employment contract now prevailing. The conference at Atlantic City was attended by members of the scale committee representing the operators of the New River field and by members of the scale committee representing the miners of the same field. The conference adjourned to meet at Charleston on June 26. There will be little difficulty in reaching an agreement as to wages but one or two other propositions may make the task somewhat more difficult although it is believed an agreement will eventually be reached.

#### GOOD FEELING IN FAIRMOUNT REGION PRONOUNCED

The United Mine Workers of Clarksburg and vicinity began the last week in June to make elaborate preparations for their street parade, picnic and victory celebration which was scheduled for July 4. The celebration was arranged for by Pinnickinneck Local No. 1379. Invitations were sent out to every local within a radius of 50 miles of Clarksburg so that it will partake much in the nature of a state celebration. An effort was being made to secure Frank J. Hays of Indianapolis, international president. State Labor Commissioner S. B. Montgomery is also scheduled to deliver an address.

Of more than passing interest and significance was the decision of the coal operators' committee and the miners' committee of the Preston County field to have the operators and miners attend a celebration at Kingwood on July 4 and 5 in a body, inasmuch as it disclosed the cordial feeling existing between the miners and operators of that section. The operators were arranging to furnish a brass band, put 2500 men in the line of the parade and to furnish and roast the biggest bull in Preston County. Every man

connected with the mining industry in Preston County was invited to be present. Gov. J. J. Cornwell will be one of the speakers.

Four weeks of strike in the coal mines near Fernie and throughout District No. 18 have resulted in no visible advance toward a surrender on the part of the operators, and the miners through their union leaders have applied to Premier Oliver for the appointment of a commission to investigate wages and working conditions within the mines, and have stated that upon this request being granted the strike shall be declared off within 24 hours.

It will be noted that the Gladstone local union at Fernie called upon the pit bosses to relinquish their work and so permit the mines to fill up with water and gas, but these officials did not believe themselves entitled to do so, in view of their responsibilities not only to the operator but also to the state. The correspondence relative to this attempt on the part of the local union at Gladstone follows herewith:

#### RESENT SHORT PAY THAT GOES WITH SHORT HOURS

Fellow workers, we wish to draw your attention to the fact that we are at this time engaged in a struggle to maintain the just rights of a certain portion of our membership. We think it is hardly necessary to point out to you the fairness of our demands, as you must readily realize that with the cost of living forced up to the limit, whereby it is impossible for the worker to support himself and family, it is absolutely essential that there be no reduction in wages at this time, but rather a general increase all around is needed to offset the ever-increasing cost of the necessities of life.

It has come to our notice that the coal company intends to use your services to replace those of some of our members who are out to secure a living wage.

Fellow workers, we appeal to you not to permit yourselves to be used for such a despicable purpose. We would ask you to fall in line with the firebosses, who to a man refused to fill any job of a man who is out on strike. We realize the position they have placed themselves in by such action, and we certainly admire their courage. The members of Gladstone local union have already pledged themselves not to resume work until all firebosses are reinstated without prejudice or discrimination on the part of the management, and are ready to take the same stand with regard to yourselves. We ask that you will think the matter over carefully. Is it worth while to earn yourselves the animosity or illfeeling of all right-thinking men, to pander to the wishes of those who, however much they pretend to have your interest at heart, would if it suited their purpose take the same stand in regard to yourselves that they are taking with the ten and eleven-hour men at the present time? (Signed) "Gladstone Local Union, per Secretary."

#### PIT BOSSES DECLARE THEIR MORAL OBLIGATION

In reply to the foregoing the pit bosses directed a letter to the members of the miners' union, the essential part of which reads: "Most mine officials are holding their positions, not only through the company's choice, but by government qualification, and in the ordinary course of affairs are responsible to both parties for the safe and efficient management of their respective departments. At the present time, owing to the conditions created by a general suspension of work, they are simply trying to limit the unavoidable damaging of property, upon whose welfare the city of Fernie depends for its very existence."

Should we imitate the example of the firebosses formerly employed at Coal Creek mines, who, taking a different view of the obligations inherent to their position, ceased work immediately when the general strike order went into effect, we would render ourselves guilty of a grave breach of trust and an action that all right-thinking men could not fail to consider as highly reprehensible.

We might further state that at no time has the management required the officials to do any kind of work other than that strictly covered by the strike clause included in the agreement still in force.

# To Our Friends From Across the Sea



**E**VERYONE will see at a glance that these people are Romany Gypsies. Though they have lived many hundreds of years among other people, they have never made any friends. The reason for this is that they do not dress like other people, they talk their own language when speaking to one another, and they do not care to live in tidy quarters. Some of the foreigners who come over here soon dress like us, talk English as we do and keep their homes as neat as a new pin. These people soon find that they have lots of friends in America. Other foreigners wear shawls, go around barefooted, with disorderly hair, and Americans find it hard to be friendly with them.

## Be an American!

Dress well, talk English only, keep an orderly home,  
and everybody will welcome you





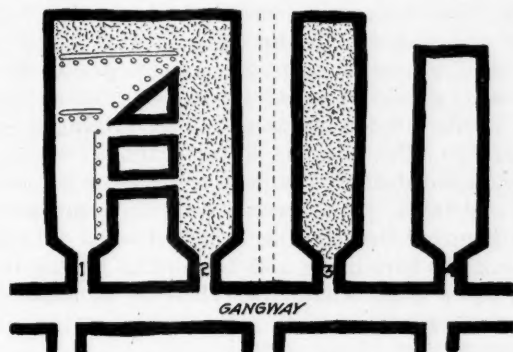
## DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

### Robbing Pillars, Anthracite Mines

*Letter No. 1*—Referring to the article of Joseph R. Thomas, *Coal Age*, May 22, p. 938, kindly permit me to submit the following brief sketch of my own experience in drawing pillars on steep pitches in the anthracite mines of Pennsylvania, where I worked as miner and assistant foreman, both in directing and performing the work and caring for the safety of the men employed.

The accompanying sketch will show the method that I used and which proved very satisfactory, both in respect to the amount of coal recovered in the pillars and the safety of the men engaged in the work. Considerable of this work of drawing back pillars had to be performed under a clay or sandy top that made it necessary to protect the men with temporary batteries, formed by setting a row of posts across the chute and nailing lagging to the back of the posts. As indicated



DRAWING PILLARS ON STEEP PITCHES

in the figure, this form of battery was first extended across the chute and then across the pillar. The work of taking out the pillar was started by driving a narrow crosscut through the pillar about 15 or 20 ft. below the upper end. When the pillar had been thus cut through, the stump above the crosscut was taken out, the work being started at the upper corner. As shown in the figure, it was necessary to keep a row of posts just behind the men and these posts were set with good cap-pieces above them.

At times when the roof was bad, it was necessary to use forepoles that projected over the men to keep loose material from falling on them while at work. In this manner, the entire pillar was removed in sections, taking out one stump at a time. It would happen sometimes that the caving of a room on each side of a pillar would make it impossible to draw back that pillar, without driving a narrow heading up the center, as indicated by the dotted line in the center of the pillar between Rooms 2 and 3 in the figure, these two breasts being shown as caved. This is never done, however, unless there is no other way of taking out the pillar,

as the driving of the heading up the center of the pillar means additional expense for yardage, and the other plan mentioned is much cheaper and safer.

Fern Glen, Penn.

JACOB SKOFF.

### Mine-Haulage Proposition

*Letter No. 1*—In answer to the request of J. H. Dickerson, *Coal Age*, June 5, p. 1058, asking for suggestions regarding a change that he proposes to make to shorten the haul in his mine, permit me to say that my opinion is that it would pay to make the change suggested, unless the cost of cleaning up, timbering and laying the new track proves to be heavier than what I imagine.

Mr. Dickerson gives no data regarding the present condition of the haulage road now in use. I assume, however, that this is an old haulage road that has been in use a long time, as the development of the mine must be considerable, judging from his statement that the distance from the working face to the foot of the hoisting shaft is 2½ miles by the old road.

Now, it is probably true that the expense of keeping up the old road, including repairs of track, replacing worn rails and setting new timbers to say nothing of cleaning up roof falls and making the necessary allowance for delays caused by wrecks due to broken rails, bad track, etc., is a considerable item on the monthly cost-sheet. This expense will all be avoided when the new road is ready for use.

The condition of the entries that are to form the new road must be bad indeed if the expense of cleaning up these entries, timbering and laying the track is so great as not to warrant the investment. It is estimated that this proposed change would shorten the haul by a distance of 875 ft., which would certainly prove an important item in the relative cost of operation and would greatly improve the efficiency of the service, increasing the output of the mine and bringing larger returns on the capital invested.

Comparing the two methods, the present system of haulage represents a higher cost of maintenance, a smaller daily output of coal, and involves the possibility of delays caused by wrecks and necessary track repairs, all of which means reduced efficiency in the mine and a higher cost of production. On the other hand, the adoption of the proposed change would mean a considerable expenditure at the start, in order to clean up the entry and timber and lay the track. It is true that this expense would all come at one time, but the result would be an increased output of coal each day, greater efficiency in the mine and a large reduction in cost for repairs and maintenance. As a result, the cost of production would be greatly decreased.

One should consider, also, that in the old system now in use, the high cost of maintenance comes at a time when it is least desired, when the mine is on the

retreat or decline and there is an ever-decreasing income to be realized on the output. Let me repeat, then, that in my opinion the proposed change will amply repay the outlay required, judging from the information available.

SAMUEL MCKAY.

Burgettstown, Penn.

*Letter No. 2*—Referring to the proposition of shortening the haul in a mine, as suggested by J. H. Dickerson, *Coal Age*, June 5, p. 1058, let me say that I would not hesitate to finish the work already started and make the proposed change, as this would give a straight haulage road and shorten the distance to the foot of the shaft 875 feet.

Assuming that the number of trips made by the motor would be increased in proportion to the shortening of the road or the distance to be hauled, I estimate that the motor would make 25.7 trips a day, instead of 24 trips as formerly. It is stated that the distance from the working face to the foot of the shaft is  $2\frac{1}{2}$  miles, which makes the present length of haul  $2\frac{1}{2} \times 5280 = 13,200$  ft. By the new road, the length of haul would, therefore, be  $13,200 - 875 = 12,325$  ft. Then, calling the number of possible trips, after making the change,  $x$ , we have  $12,325:13,200::24:x = 25.7$  trips.

Hauling 50 tons in each trip, this would mean an increase in the daily output of the mine, for the same capacity of the motor,  $50(25.7 - 24) = 85$  tons. It is probable, however, that the hauling capacity of the locomotive will be increased by this change, owing to the haul being over a straight road having no crooks or turns and there being less danger of delay from derailed cars and other causes. The grades of both roads can be considered as practically level, but the new road will have a great advantage over the old road for a long time to come, both with respect to economy and safety.

There is another item of saving worthy of mention, since it will be available eventually. I refer to the saving in rail and trolley wire, which would also be in proportion to the shortening of the haul. Using 25-lb. iron, estimated at a value of, say \$80 per ton, and trolley wire valued at 30c. per foot, the total saving effected by the change would be

$$\text{For rails, } \frac{2 \times 875}{3} \times \frac{25 \times 80}{2000} = \$583.33$$

$$\text{For wire, } 875 \times 0.30 = \$262.50$$

Total \$845.83

This is a saving well worth considering.

West Pittston, Penn.

RICHARD BOWEN.

## Coefficient of Rolling Friction

*Letter No. 1*—Little as most mine officials may realize it, our old friend the coefficient of rolling friction is one of the most dominating factors in the production of coal. This is not appreciated as it should be, it being one of the unseen forces, and the average mining man has enough visible worries to keep him fully occupied without hunting others that do not appear.

The wrecking of a trip in the mine, the burning out of an armature, a squeeze or a roof fall receives prompt attention by mine officials; but labor unrest, loss of supplies and, among many other things, the wasting of power due to the abnormal journal friction of plain-

bearing cars, which gives a high coefficient of rolling friction, are the invisible factors so generally ignored and yet so productive of high cost of production.

In the issue of *Coal Age*, May 29, p. 999, E. Steck, Hillsboro, Ill., developed certain facts concerning the haulage capacity of locomotives that had a rolling friction of 30 lb. per ton when hauling plain-bearing cars (presumably) having the same rolling friction.

Rolling friction includes the track resistance as well as the journal and other frictional resistances due to the rubbing of wheel hubs on the points of axles, journal boxes or holding devices. But since the track resistance is only a fractional part of the total resistance encountered, it can very properly be ignored. In other words it is so small that it cannot be justly considered as a separate item.

The 10-ton-motor, discussed in the article, developed 103 hp., at 7 miles per hour, it being equipped with steel-tired wheels, which meant that its tractive effort would be one-fourth of its weight or 5000 lb. while its effective drawbar pull, for level track and grades varying from 1 per cent. to 5 per cent., was found to be as follows:

Level track.....	4700 lb.	3 per cent. grade....	4100 lb.
1 per cent. grade....	4500 lb.	4 per cent. grade....	3900 lb.
2 per cent. grade....	4300 lb.	5 per cent. grade....	3700 lb.

The effective drawbar pull is the tractive effort minus the track and frictional resistances of the locomotive to which must be added 20 lb. for every 1 per cent. of grade multiplied by the weight of the locomotive in tons, which in this instance is 10 tons. The number of tons this locomotive would haul on the different grades was found to be as follows: Level, 157 tons; 1 per cent. grade, 90 tons; 2 per cent. grade, 61 tons; 3 per cent. grade, 46 tons; 4 per cent. grade, 35 tons; 5 per cent. grade, 28 tons. The frictional resistance of the mine wagons or pit cars, as stated previously, was considered as being the same as the frictional resistance of the locomotive (30 lb. per ton) and it was assumed that the cars weighed when fully loaded 5.25 tons, the tare being 1.25 tons. The locomotive was shown to be able to haul the following number of cars and tons of coal:

Grades	No. of Cars	Tons Coal per Trip
Level .....	30	120
1 per cent. ....	17	68
2 per cent. ....	12	48
3 per cent. ....	9	36
4 per cent. ....	7	28
5 per cent. ....	5	20

The number of cars hauled was found by dividing the haulage capacity of the locomotive by the gross weight of a car (5.25 tons); and the number of tons of coal hauled was found by multiplying the number of cars by four tons, that being the capacity of each car.

The frictional resistance of 30 lb. per ton, or a coefficient of rolling friction of 1.5 per cent. is all right for computations based on plain-bearing wagons, though it is at times slightly lower but more often somewhat higher. However, as showing that it is not fair to consider all mine cars or wagons as having this high frictional resistance, there are a number of completely authenticated tests that have shown that the frictional resistance of flexible, roller-bearing wagons averages 12.9 lb. per ton, which gives a coefficient of rolling friction of 0.645 per cent., as has appeared in former issues of *Coal Age* and other journals.

To speak of mine cars, in general, as having a frictional resistance of 30 lb. per ton, tends to discredit those mining officials who are discarding their old fash-



ioned plain-bearing equipment simply because they discovered that they were wasting many dollars through excess of power, lubricant and labor required to run the old type of cars.

Using the same haulage capacities or capacity for the different grades as developed by Mr. Steck we can find the number of cars and the tonnage of coal hauled per trip by the same 10-ton locomotive, by substituting the frictional resistance of the roller-bearing cars (flexible rollers, 12.9 lb.) for the frictional resistance of the plain-bearing cars (30 lb. per ton).

The results are as follows:

Grades	No. of Cars	Tons Coal per Trip
Level .....	69	276
1 per cent. ....	26	104
2 per cent. ....	15	60
3 per cent. ....	11	44
4 per cent. ....	8	32
5 per cent. ....	6	24

The increased tonnage amounts to the following: Level track, 130 per cent.; on a 1 per cent. grade, 67 per cent.; 2 per cent. grade, 25 per cent.; 3 per cent. grade, 22 per cent.; 4 per cent. grade, 14 per cent. and on a 5 per cent. grade about a 20 per cent. increase. This discrepancy for the 5 per cent. grade is due to the fractional parts of a car, which might have been added but it was deducted.

It is seen therefore that the difference in the coefficient of rolling friction of the flexible, roller-bearing wagons (0.645 per cent.) and that of the plain bearing cars (1.5 per cent.) has quite an appreciable effect on the actual tonnage that can be hauled by a locomotive of a given size. It is not reasonable to consider the figures for grades over 3 per cent., for it is seldom that the grade in a main haulageway will ever be greater than that, except for very short distances, and even that is a good indication that some grading can profitably be done.

It is hardly possible than 69-car trips could be handled in the average mine operation, so that we must then consider that instead of a 10-ton locomotive being required, that an 8-ton or even a 6-ton locomotive would haul 30 cars on a level track, provided they were equipped with flexible, roller-bearings; whereas, as demonstrated, a 10-ton locomotive would be required to haul 30 cars of the same size when equipped with plain, friction-bore wheels.

#### GRADES IN HAULAGE MUST FAVOR LOADS

There is no real good excuse, except in isolated cases, for a pronounced grade against the loads; and the grade against the loads should never exist except for very short distances, if maximum production is desired. The ideal track layout is where the grades are equalized; that is, where the locomotive has to exert as much energy in hauling the empties back into the mine as it does when hauling the loaded cars out.

It must not be assumed, however, that there will be no power saving on even a very pronounced grade, for there will always be the saving that is brought about by reduced journal friction, which as pointed out is a factor well worthy of consideration at all times. The pull exerted by gravity is the factor that limits the haulage capacity of locomotives on grades, and since it exerts a pull of 20 lb. per ton on plain-bearing and roller-bearing wagons alike, the decreased savings on long and pronounced grades is easily explained.

It is even of more importance to have easy running cars, or cars requiring a low drawbar pull per ton,

when the grades are against the empties for the reason that the drawbar pull of plain-bearing cars increases 40 per cent. when running empty, while the drawbar pull of flexible, roller-bearing cars under the same conditions only increases 15 per cent. That means that the coefficient of rolling friction of plain-bearing cars will increase from 1.5 per cent. to 2.1 per cent.; while for flexible roller-bearing cars it will increase only from 0.645 per cent. to 0.721 per cent.

These figures take on added significance when we consider that to produce a 6-hp. value at the locomotive drawbar the input into the locomotive will be in many instances about 9 hp. and the line losses will bring this up to about 12 hp.; or if the power is purchased it will be increased to about 15 hp. Therefore, any reduction in the drawbar pull required at the locomotive represents an actual dollars-and-cents savings. Flexible roller-bearing wheels or journal boxes under mine wagons produce those savings and in addition bring about many other economies that can only be appreciated by the man who owns and operates the cars.

Philadelphia, Penn.

EXPERIENCE.

## Certification and Safety

*Letter No. 8*—Believing as I do that every man interested in the coal industry and working for its betterment should voice his opinion in regard to the employment of uncertified men, as permitted by the revised mining law of Pennsylvania, I am led to offer a few comments on this subject.

In my opinion, when the legislature of Pennsylvania passed the act revising the former mining law, which required all mine foremen, assistant foremen and firebosses to hold certificates of competency granted them by state examining boards, the law makers took a step backward. In support of this opinion, let me ask, what was the object sought to be attained by the old law, in requiring the certification of these officials? The answer is, it was to secure more efficient management in the mine and promote the health and safety of all persons employed underground. Today, the efficient management of mines is just as important as ever, and it is just as necessary to promote the safety of mine workers as it was in those days when certification was made a law in Pennsylvania.

In respect to responsibility, I suppose that an uncertified mine foreman would be held responsible for whatever might happen in the mine of which he had charge. But a man cannot be held responsible for things that he does not know; and how many uncertified foremen know all the requirements of the mine law regarding the safe operation of mines? Further, if the mine foreman does not know what the law requires, how can he know that the operations in his charge comply with the law in respect to safety?

Again, there are some mine foremen who are not citizens of this country and cannot, therefore, obtain a certificate. Others have not worked in the mines of the state the necessary five years required by law. The employment of these men is an injustice to American citizens who have fitted themselves for the position of mine foreman and, by hard study, have succeeded in passing the examination and securing the certificate granted by the State Board of Examiners.

Aside from these reasons, however, it is my belief

that no uncertified official can or does command the same respect as the man who holds a certificate certifying that he is competent to perform the duties of mine foreman. Where there is no respect for the foreman in charge, there can be no discipline in the mine; and where there is little or no discipline, there is greater liability to accidents that can only be avoided by the strict enforcement of the mine law and the mining rules and regulations.

Speaking from my own personal observation, allow me to say that that piece of paper, which our lawmakers have now thrown into the scrap pile by reason of this amendment, has had a wonderful effect on all the men employed in our mines. For the benefit of the operator, and for the sake of the men employed underground, the amendment should be repealed and the certification of mine officials restored.

#### THE VALUE OF CERTIFIED MINE FOREMEN IN THE ECONOMICAL OPERATION OF MINES

Few men will deny that the certified man is worth far more to the operator, in the long run, than the uncertified man. The certificate shows that the former has studied mining and has a knowledge that the other does not possess. Before the passage of the amendment, Pennsylvania was in the lead in respect to state mining laws; but the act permitting the employment of uncertified men in the mines has placed us far in the rear of any of the other coal-producing states.

While the uncertified man may make good for a time, sooner or later the occasion is sure to arise that will show his incompetency and reveal the need of certified men in that position. The study required to gain a certificate has made the certified foreman familiar with the requirements of the law and acquainted him with a knowledge of the principles of mining that makes him master of the situation at all times.

In closing, let me urge that all men interested in safe mining should insist that none but certified men be employed in a responsible position in the operation of a mine. The employment of uncertified foremen may some day prove a very costly experiment, owing to the ignorance of the foreman in charge and for which the state is mostly responsible.

Experimenting with uncertified foremen is unnecessary, today, as there are scores of certified men who hold no position and whose study and labor in preparation for foremanship was rendered of no value by this enactment. Let me say that certification is the only safe rule in mining operations and should once more be made law in Pennsylvania and placed on the state docket.

GRIFFITH GRIFFITH.

Blackfield, Penn.

*Letter No. 9*—I read with deep interest the letter of James Touhey, *Coal Age*, Feb. 20, p. 374, regarding the necessary certification of mine officials, in order to secure a maximum of safety in mining operations. Mr. Touhey has dealt with the subject in such a manner that there is little to be added in support of the question of the need of all mine officials being certified.

In the second letter that appeared on this subject, however, James M. Roddie, Apr. 17, p. 723, raises two points to which, I believe, exception will be taken by many readers. He suggests that the candidate for a certificate entitling him to act as mine foreman should

have "at least nine years of practice in the general routine of underground work." Again, speaking of state mine inspectors, he says that they are "the intelligent heads, generally of the state boards of examiners." The statement, to say the least, would seem to reflect seriously on the other members of the board.

#### FIVE YEARS PRACTICAL EXPERIENCE SUFFICIENT

Now, in regard to the experience required of a candidate for a certificate of competency, it is my opinion that a longer term than five years' practical experience in and around the mine is not always essential and would not guarantee the competency of a man to act as mine foreman. My belief is that it is possible for a person having five years' practical training to become proficient in the various operations of mining and be able to discharge his duties as foreman.

It must be admitted, as Mr. Roddie agrees, that a certificate of competency is merely "an index," and not a guarantee that its holder is competent. Such a guarantee must be based on the successful performance of a foreman's duties in a mine of which he has had charge; but that would be a poor excuse to offer in favor of employing uncertified mine foremen.

Again, Mr. Roddie's characterization of state mine inspectors as "the intelligent heads of examining boards" seems unfair. Allowing that the certificates they grant are merely indices of a candidate's qualifications does not, as Mr. Roddie claims, make the board of examiners who grant such certificates "mere indices themselves."

The granting of a certificate to a candidate is simply evidence that he has satisfied the requirements of the examining board. Here the authority of the state mine inspector, as a member of the examining board ends. The appointment of a certified man to act as mine foreman is not under his control or that of the state, but is left to the direction of the mine operator or the management of the mine. It would be absurd to suppose that an examining board could guarantee the competency of a man appointed to a position by another party.

#### DISCUSSION BY INSTITUTE REACHES NO CONCLUSION

Before closing, I want to endorse what Mr. Touhey has said in regard to the failure of an intelligent body of men, such as the Coal Mining Institute of America comprises, in discussing the need of the certification of mine officials, to reach any understanding. To my mind, such a result is inexcusable and suggests that other matters were before them that were of more consequence than the question of safety in coal mining.

My opinion is that the employment of uncertified men as foremen in mines is a backward step and invites the miserable conditions that existed before the government of Great Britain found it necessary to appoint commissions to ascertain the causes of mine accidents and means for their remedy.

The past history of coal mining is a record of great loss of life and property as the result of unrestrained and careless practices. The oft recurring disasters in mines created the necessity of enacting laws requiring that mine officials possess more theoretical and practical knowledge, and we now recognize that these laws have made mining safer and more efficient than was possible by the former haphazard methods employed.

Today, the universal cry for more education and greater efficiency in every branch of the industry is



fully justified and particularly so in coal mining. This cry should silence all arguments in support of the policy of employing uncertified men in positions of responsibility underground.

WILLIAM WESNEDGE.

Ladysmith, B. C., Canada.

## Bolshevism in America

*Letter No. 1*—The opening statement made in the Foreword in *Coal Age*, May 15, predicting the failure of Bolshevism, for the reason that "what a man gets by force will eventually be taken away from him by someone else who is stronger," has a particular application to America today. This is, as indicated by the title of the foreword, the "Day of New Ideals." The new is replacing the old in every event of life, and every day sees the American citizen growing stronger. Under these conditions, Bolshevism has no chance.

The spread of this evil in our country has been often referred to as a menace to be feared. But, in seeking a remedy, we must place ourselves squarely behind our ideals of justice and equity. We must see that no person has any cause for legitimate grievance, under our flag. It is true that Bolshevism is a menace to the safety and peace of the country if the American people do not awaken to its danger and give adequate support to our executives and judges in their rigid enforcement of the laws against organized anarchy.

What is needed, today, more than anything else, is the enactment of laws that will deal promptly and adequately with that freedom of speech that advocates anarchy and violence, criticises the government, attacks the constitution or in other ways reveals a spirit that is un-American.

Under the constitution, the government of our fathers has made us the freest, happiest, most successful and most powerful nation on the earth. To maintain these characteristics, we must array ourselves on the side of justice and against all disturbing propaganda. When our people give their loyal support to the legislators and the courts, in their enactment and enforcement of our laws, there is afforded no opportunity for anarchy to raise its head and disturb the peace of the country.

On the other hand, if the people manifest a spirit of indifference and assume the attitude of "Let George do it," they open the door for Bolshevism to enter and let down the bars for the spread of anarchy. In closing, let me say that, if what American people have and hold as a gift of their fathers is worth preserving, we must fight for it whenever and wherever it is endangered.

Clinton, Ind.

JUSTICE.

## Firebosses as State Officials

*Letter No. 7*—Kindly permit me to correct the statement of W. Wesnedge, which he made in his letter, *Coal Age*, May 15, p. 919. In referring to my previous letter, Mar. 20, p. 544, he seems to regard me as favoring the employment of firebosses by the state.

In that letter, however, I said plainly "I am not in favor of firebosses being employed by the state; nor do I think that they should be considered in any other capacity than that of a mine examiner, whose duty is not only to examine the mines for gas but to discover any other danger such as may arise on the roads, travelingways or working places of the mine."

I did remark that "these men should be in the mine during the entire day," but it was my meaning that they should perform a full eight-hour shift. In my opinion, the work that falls to a mine examiner, if properly performed, will keep him busy eight hours every day. My plan has always been to have the mine examiners enter the mine eight hours before the time for the men to start to work in the morning. This gives them ample time to examine the mine and remove all dangers from standing gas, requiring the extension of brattice for its removal, taking down of any loose top and setting any necessary timbers for the support of the roof in the working places, besides performing other tasks required to make the mine safe for work and maintain a healthy condition.

### FIREBOSSSES, MINE EXAMINERS, SAFETY INSPECTORS

On coming out of the mine in the morning, my idea is that they should not be called on to enter the mine again that day. Instead, there should be a second force of mine examiners that enter the mine at 7.30 a. m., or when the men proceed to work. These examiners should remain in the mine a full shift and look after the safety of the men at work in their places. If the term "mine examiner" does not properly apply to this second force of examiners, I would suggest calling the first set of men who perform the work of the so-called fireboss, the "mine examiners," and the second set of men who remain in the mine during the day and look after the safety of the men at work, "safety inspectors."

My reason for outlining this plan, by which the mine examiners remove all accumulations of gas as they find them, is that the brattice they erect for this purpose will still be in place and a good current of air will be sweeping the face when the men enter their places for work in the morning.

### DANGER OF REMOVING GAS DURING THE DAY, WHEN THE MEN ARE AT WORK

In the present plan of firebossing, a place containing any dangerous supply of gas is reported as being "unsafe" and a danger sign is fixed at the entrance of the place to warn men of the danger. Then, when the fireboss has had his breakfast he returns to the mine and proceeds to remove the gas from those places where it was found. But, this must be done when a hundred or more men are at work in the mine. Moreover, there is always a chance that some heedless miner may enter the place with an open light, not seeing or else ignoring the danger sign, and in doing so he endangers the life of every man in the mine.

When foreman of a very gaseous mine it was always my plan for the firebosses to enter the mine at 11 p. m., an hour before midnight. Between that time and the beginning of the morning shift, they were able to remove all accumulations of gas from the working places by extending brattices in such places where gas was found. When the men went to work in the morning every place was clear of gas and the mine safe from explosion. I have always advocated this policy as being the only sure method of performing the work of firebossing. When gas is allowed to remain standing in a working place, with the intention of removing it later, there is surely the liability of a possible explosion occurring, which chance is avoided by the prompt removal of the gas when found.

Farr, Colo.

ROBERT A. MARSHALL.



## INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



### Modulus of Elasticity

Kindly explain the meaning of the expression "modulus of elasticity," and describe in what way it is used in practice. I find the term used frequently in textbooks treating the strength of materials but have not understood its application.

Chicago, Ill.

ELECTRICIAN.

The root meaning of the word *modulus* is a measure and the "modulus of elasticity" of any material is a term or quantity that is the measure of its elasticity. For example, a force applied to a steel wire in the direction of its length will cause an elongation in proportion to the force exerted, per square inch of section of the wire and within the limits of elasticity of the metal. Some materials are very elastic and others less so, the elastic limit being greater in the former than in the latter case.

If the force applied is such that the elastic limit of the material is exceeded there results a permanent deformation; in other words, the material does not return to its original form or state when the force ceases to act. Beyond the limit of elasticity of any material, rupture is liable to take place. The force producing rupture, expressed in pounds per square inch, measures the ultimate strength of the material.

It has been found that the average quality of steel is elongated  $1/29,000,000$  of its length for each unit of force (lb. per sq.in.) exerted on the cross-section of the material, within the elastic limits of the steel. Thus, if it were possible to assume that the elasticity of the steel was not exceeded, a force of 29,000,000 lb. per sq.in. of section would stretch a steel wire an amount equal to its length. In other words, the length of the wire would be doubled. But, since the elongation within elastic limits is proportional to the force applied per square inch of section, the ratio of that unit force (lb. per sq.in.) to 29,000,000 expresses the fraction of elongation.

For example, a 000-wire has a sectional area of 0.1318 sq.in. (167,805 circ.mils). A force of 1000 lb. applied to this wire will produce a tension of  $1000 \div 0.1318 = 7589$  lb. per sq.in. The elongation in 100 ft. of this wire would then be  $(7589 \times 100 \times 12) \div 29,000,000 = 0.314$  in.

It may be of interest, in this connection, to estimate the tension or pull (lb. per sq.in. of section) that would cause an elongation equal to the expansion due to a rise, in temperature, of 1 deg. of the Fahrenheit scale, in any given length  $l$  of steel wire.

For example, taking the coefficient of expansion of the steel as 0.00000625, the expansion, per degree (Fahr.), is 0.00000625  $l$ . Also the elongation of the same length of wire due to unit pull  $p$ , or tension, (lb. per sq.in.) is  $1/29,000,000 lp$ . Therefore, equating these two values and finding the stress or tension required to

produce the same change in the length of wire as a rise, in temperature, of 1 deg. F., we have

$$1/29,000,000 lp = 0.00000625 l$$

$$p = 29,000,000 \times 0.00000625 = 181 + \text{lb. per sq.in.}$$

Practically, therefore, a tension of 181 lb. per sq.in. in a steel wire produces an elongation equal to the expansion caused by a rise in temperature of 1 deg. F.

### Cost of Electric Lighting

We are about to install a system of electric lighting, on the main haulage road, in one of our mines. The distance from the shaft bottom to the inside parting is 2000 ft. We propose to use 25-watt, tungsten lamps distributed along the haulage road at distances of 100 ft. apart, which will require, say 40 of these lamps. They are to be operated on a 110-volt circuit, and we are anxious to know what size of copper wire should be used in this installation; also, the cost of lighting if electricity is purchased at the rate of 13½c. per kw.-hr. and the system is operated ten hours a day.

—, Tenn.

SUPERINTENDENT.

The first step in the solution of this problem is to decide on the permissible line drop, which we will assume to be 5 per cent. of the voltage at the generator, leaving 95 per cent. of that voltage to be consumed by the lamps. The second step is to ascertain the current required to light these lamps, which is found by dividing the total wattage by the effective voltage, or the voltage absorbed by the lamps. Forty 25-watt, tungsten lamps consuming 95 per cent. of the 110-volt pressure will require a current of  $(40 \times 25) \div (0.95 \times 110) = 9.57$ , say 10 amp.

Now, allowing for a 5 per cent. line drop the size of wire required to transmit a current of 10 amp., under a pressure of 110 volts at the generator, is found by multiplying the resistance of the wire per mil-ft. (10.8 ohms), by the length of the wire, in ft. ( $2 \times 2000 = 4000$  ft.), and that product by the current required for the lamps (10 amp.), and dividing this result by the effective voltage, or the voltage absorbed by the wire conductor ( $0.05 \times 110 = 5.5$  volts). The result thus obtained will be the circular mils required in the wire, or the square of its diameter, in mils.

Applying this rule, we find the required circular mils in the wire section, in this case, is  $(10.8 \times 4000 \times 10) \div 5.5$  equals 78,545 circ.mils. The diameter of wire required is, therefore,  $d = \sqrt{78,545} = 280$  mils. or 0.28 inch.

The cost of operating this lighting system, consisting of forty 25-watt lamps, at the given rate (13½c. per kw.-hr.), will be  $40 \times 0.025 \times 0.135 = 13½$  c. per hour, or \$1.35 per day of ten hours. The forty 25-watt lamps consume  $40 \times 25 = 1000$  watts, or 1 kw. of energy.





## EXAMINATION QUESTIONS

ANSWERED BY  
JAMES T. BEARD



### Bituminous (Penn.) Firebosses' Examination, April 11, 1919

(Selected Questions)

**Ques.**—What should a fireboss know about mine gases and why?

**Ans.**—A fireboss should be thoroughly familiar with the character and behavior of the common mine gases and those forming the atmosphere; namely, methane or marsh gas, often called carbureted hydrogen ( $\text{CH}_4$ ), carbon monoxide or whitedamp ( $\text{CO}$ ), carbon dioxide ( $\text{CO}_2$ ), hydrogen sulphide or sulphureted hydrogen ( $\text{H}_2\text{S}$ ); and the heavy hydrocarbon gases, olefiant gas or ethene ( $\text{C}_2\text{H}_4$ ) and ethane ( $\text{C}_2\text{H}_6$ ). The principal gases of the atmosphere are nitrogen ( $\text{N}_2$ ) and oxygen ( $\text{O}_2$ ).

The fireboss should know the specific gravity of each gas referred to air as unity and its density referred to hydrogen, besides the molecular weight, which is twice the density. It is important that he should understand the laws of diffusion, the occlusion of gases in the coal, and their emission or escape through the pores of the coal, besides the escape of gas by feeders when the gas issues from pockets or crevices in the strata.

The fireboss should understand the effect of mine gases on flame and on human life, and be familiar with their character as inflammable, explosive, or poisonous. He should understand the principles and facts of combustion and know what gases are extinctive and which support combustion. He should understand the effect on mixtures of gases forming the firedamp, blackdamp and afterdamp in mines.

Finally, the fireboss must understand how to remove gases from the mine, in the quickest and safest manner, and know what is necessary to do to perform the work. He should be able to detect the presence of the different gases, in mine workings, with the aid of the safety lamp, in order to perform the duties of an efficient and competent fireboss and insure the safety and health of the men in his charge.

**Ques.**—State, in detail, where, when and by whom danger signals should be used.

**Ans.**—When a fireboss enters the mine in the morning, he must place a danger signal at the top of the shaft, or the mouth of the mine, as a warning that men must not enter until the signal is removed. He must place a danger signal at each entrance to a place where gas is found to prevent men entering such places unwarned. The fireboss must be careful to see that all abandoned places where gas may collect are fenced off with proper danger signals.

In case a miner's shot misfires, or he discovers some danger in his place, it is his duty to withdraw and place a danger signal at the entrance to the place, after which he should report the danger to the foreman. It is the duty of the foreman, or the superintendent

of the mine, to see that proper danger signals are placed at the entrance when the mine is idle for a time, or when the circulation of air in the mine is impeded or shut off by damage to the fan or obstruction in the air-courses.

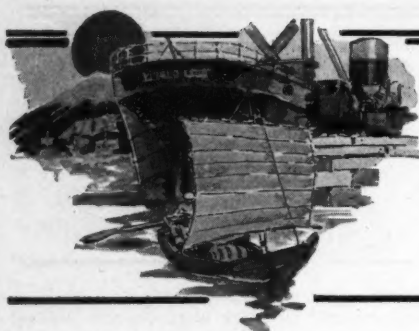
**Ques.**—Under what conditions should locked safety lamps be used in bituminous mines?

**Ans.**—This is a question that the mine inspector of the district in which the mine is located must decide in accordance with the conditions known to prevail in the mine. In general, it must be stated that locked safety lamps should only be used in mines generating gas in such quantities that the air in the workings is liable to reach a dangerous condition owing to the presence of gas or dust, or both of these combined. With proper equipment and careful supervision and inspection, it is generally preferred to depend on an adequate and efficient ventilation of the mine workings, rather than to insist on the use of locked safety lamps, which are always a hindrance to the work of the miners and serve to suggest the presence of possible danger in the mine. The use of locked safety lamps also invites tampering by curious individuals and fooling with the lamps by irresponsible boys and men. The use of locked safety lamps may also have a tendency to decrease to some extent the efficiency of the inspection of the mine. The use of locked safety lamps in pillar workings is important where gas is known to exist in the strata above or underneath the coal.

**Ques.**—Give in detail the duties of a miner, and state what qualifications he should possess before being given charge of a working place.

**Ans.**—It is the duty of a miner entering his place for work in the morning, or after a short absence, to examine carefully the condition of the roof and coal to ascertain if any danger exists. In case one or more props have been dislodged by the firing of a shot in the place, it is his duty to reset the posts at once. These duties must be performed before the miner proceeds to load any coal or do other work in the place. He must also examine to see that the fireboss has left his mark on the face of the coal and not finding this, he should withdraw and report the fact to the foreman or one of his assistants. When mining the coal, the miner must set the necessary sprags and posts to protect himself from a possible fall of coal or roof. From time to time, he must examine the roof above him to see that it is safe. He must always watch for any slips that may occur in the roof.

Before being put in charge of a place, a miner must show that he has the necessary qualifications that fit him to protect himself and keep his place safe. He must be able to set timber properly and know how to mine his coal to the best advantage and with safety. When working with a locked safety lamp, the miner must understand its use and be able to detect the presence of any gas.



## FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS



### Chaos in British Coal Trade

#### Lowered Production and Attitude of Mine Workers Rushing England Toward Another Coal Famine—America's Entrance Into European Markets Feared

The *Journal of Commerce* (London) recently stated that chaotic conditions rule the coal trade of the United Kingdom. "We cannot adequately supply the demands of our Allies," reads the article. "Italy is on her knees for larger supplies, and we cannot give them to her. There is apparently no hope of our being able to do so during the next few months. We are fast hurrying to a coal famine again, and we have had departmental warnings that coal supplies for home consumption are likely to be scarce. Government interference with an hitherto highly prosperous trade has had the effect of bringing the industry to the verge of bankruptcy. The Government has tarried too long to the siren voices of those hyper-socialists who are bent upon 'the total elimination of colliery profits.'"

"The present state of affairs is primarily due to the reduced outputs, and the reduction of outputs is unquestionably due to the increased wage rates of colliery workmen, for it has always been a striking fact that when the wage rates of colliers are high the output per man has decreased to an extent almost proportionate to the rise in wage rates. Sir Auckland Geddes announced in the House of Commons recently that the output of coal per person employed continues to show a decrease. In 1915 the output of coal per person employed in this country was 265 tons—a time when the most able of colliers were in the army. Patriotism was at its strongest, with the result that the output per man constituted a record. Since then the output per man has declined sharply to 257 tons in 1916, 243 tons in 1917, and to 226 tons in 1918. The output per man for the first quarter of this year has actually receded to 203 tons.

"On the basis of the first quarter's returns the output this year will be 63,000,000 tons below that of 1913! Under the Sankey recommendations in July next the hours of work in mines will be reduced to seven per day, which means that the decline in the production in the aggregate and per capita will be still further accelerated. A reduction of output entails a proportionate increase in the cost of each ton of coal. Where are we drifting?

#### Supply of Coal to Italy

"The Controller has advised the Italian trade generally that he has arranged in the various coal-exporting districts that from June and onward not more than 140,000 tons per month will be allocated for shipment to Italy through the Italian State Railways. The remainder of the monthly quantity of coal allocated for Italy will be done through private coal exporters and will be treated as private business and not subject to the Italian pool conditions.

"There is every indication on the part of the Board of Trade to return as quickly as possible to normal business conditions, and exporters have been asked to arrange at once for contracts with Italian buyers. Furthermore, in order to assist private enterprise, a number of vessels allocated to the Italian State Railways Commission have been released to private shippers, and apparently there is every indication of a good amount of business being done to Italy by private coal exporters. Evidently it is the British Government's intention to give as great facilities as possible to the coal export trade, their action in this respect being apparently mainly stimulated

by the necessity of increasing the revenue derived from the coal export trade in order to offset the seriously increasing cost of production entailed as a consequence of their pandering to the miners' leaders.

#### Italy's Coal Problem

"Efforts should be made by the Government to so stimulate the production of coal that the demands of our ally, Italy, should be more adequately met. If British coals are not sent out in greater quantities, then a determined effort will be made by America to establish a regular and permanent coal trade with Italy. America is unable to do this at the present time, owing to the lack of tonnage, but this drawback is being gradually remedied, and the time will arrive when the influence of America's growing fleet of merchantmen will be felt. Furthermore, there are other factors which are likely to weigh heavily against this country in respect to the coal trade.

"At a date to be yet fixed by the Coal Mines Department of the Board of Trade, the limitation prices at which coals have been sold to Italy will cease to operate. Open market prices will be quoted, and such prices will be shillings higher than the limitation levels. At the present time, owing to heavy cost of transportation, American coals sold to Italy are much dearer than the British coals sold at the limitation prices. The abolition of the limitation prices will in all probability make British coals the most expensive, especially as the American coal exporters are preparing to make considerable reductions in order to establish a regular service of supply. The position is fraught with great possibilities for the American coal exporter, and when tonnage becomes more free a very large amount of American coal will undoubtedly be shipped to Italy. Meanwhile it is only by a veritable tour de force we can supply both France and Italy while the Board of Trade has actually issued a warning that supplies of coal for home consumption are likely to be shorter. Owing to our disabilities it is seemingly apparent that a large slice of the Italian trade must necessarily pass to America as soon as her exporters are in a position to secure a larger amount of tonnage.

"Meanwhile the disputes in the South Wales coal field and the number of miners who have absented themselves from work have reduced the output to a sharp extent.

"There is no doubt that a large number of miners have taken advantage of the fine weather to go holidaying, whilst a large proportion of the remainder are disinclined to produce the same quantity per day as was the case when wage rates were low. The Government should have insisted upon the maintenance of outputs, making the great concessions they have been given contingent upon a certain quantity of coal being raised per man employed. Some system should have been insisted upon to stamp out avoidable absenteeism on the part of workmen, and insistence upon a guarantee of a fair amount of coal being raised per month.

"The export of coal in pre-war years was a source of exceptional prosperity to the nation. With the present poor ratio of output and the probability of a still further decrease in July, when the seven hours per day operates, makes the output of 1913 a most difficult if not impossible task to surmount in the reconstruction period. Before that time America will

have long since recovered from its war disabilities, and is likely to prove a powerful competitor during this country's herculean effort to recover commercial and financial stability.

"With the prospect of a further decrease in output it is necessary, as Sir Auckland Geddes has warned the nation, to choose between restricting supplies for home consumption or further reducing the quantity available for shipment to foreign countries. To reduce our coal exports is unthinkable, except to Mr. Smillie and other paid advocates of mining workmen. The reduction of our coal exports means the increase of our indebtedness to other nations; the reduction of supplies for home consumption means the restriction of our manufactures. Such is the result of the Government's reckless concessions to the miners, and their utter disregard of the fundamental economics of our most important industry."

### Chinese Coal Market

Under date of May 22, Wheelock & Co., of Shanghai, China, report that there had been no new business done in Japan coal during the preceding fortnight, and now that feeling seems to be running so high among certain sections of the Chinese public over the Kiaochow question, it is doubtful whether the silk flatures, on reopening, will buy Japanese coal; but if they refuse to do so, we fall to see where they are to get their supplies from. The coal market in Japan continues strong, and although there is a fairly plentiful supply of the commoner kinds of coal the demand for the better qualities far exceeds the supply. This, of course, tends to keep prices very firm.

There is no change in the Fushun coal situation. Owing to a further drop in freights and the starting up of silk flatures, the Kaiping coal market has been considerably better during the period under review. Large sales in North China, Manchuria and Japan have curtailed the quantity for export, especially for the better grades, the demand for which exceeds the supply. These sales naturally strengthen the market and prices remain firm.

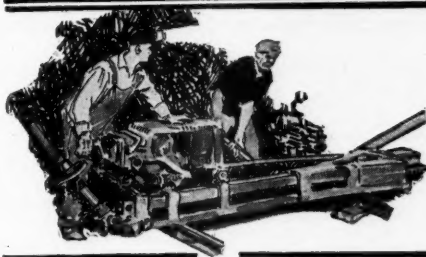
### Coal Production in Shantung

The production of coal from the mines belonging to the Shantung Railway, Tsingtau, China, for the year ending Mar. 31, 1918, was slightly less than in the preceding year. Sales in local markets amounted to 213,030 tons, valued at 911,182 silver yen (\$604,387 at exchange \$0.6633), giving an average price of \$2.78 per ton for all grades. Lump coal for household use sold at from \$7.96 to \$8.86 per ton. Exports to Shanghai, Hong-kong and Japan aggregated 129,141 tons, leaving a balance of 116,266 tons used on the railway, by the authorities, and in ways not specified. Bunker coal was supplied to vessels to the extent of 9640 tons, at an average price of \$3.50 per ton. Shipping agents report that bunker coal was not available in the quantities required by vessels.

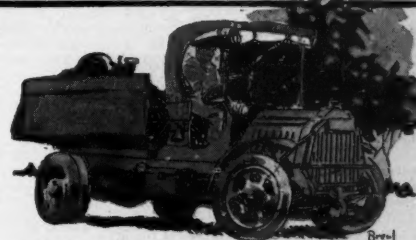
### Foreign Coal Trade Opportunity

The purchase of American bunker coal is desired by a company in Italy. The terms are cash against documents. References. Further details may be obtained from the Bureau of Foreign and Domestic Commerce, or any of its branches, by referring to File No. 29640.





## COAL AND COKE NEWS



### Harrisburg, Penn.

The Legislature of Pennsylvania adjourned on June 26, but before closing, passed two measures, one bitterly fought by mine workers and the other opposed by coal operators. They were respectively the Flynn (defining sedition) and the compensation bills.

The sedition bill was defeated in the House on June 23, because a number of members were afraid they would offend "labor" by voting for it. There is nothing in the measure to injure real Americans. The legislation simply furnishes the machinery for reaching the element in society that is endeavoring to destroy the present form of Government. The governor knew the necessity of the proposed law and finally used the influence at his command to get the bill through the Legislature. The bill was signed on June 27.

The bill opposed by the coal operators and other employers was the one making amendments to the workmen's compensation law, which increases the schedule of compensation and provides for a bureau of rehabilitation. The governor also signed this bill on June 27. The legislation was signed in just the shape the administration desired it, all attempts to make radical changes being blocked.

The compensation bill increases the rates, making \$20 a week the maximum upon which compensation is to be based. The maximum compensation to be allowed for total disability is advanced from 50 to 60 per cent. of the weekly wage. The maximum weekly amount allowed an injured employee is increased from \$10 to \$12 and the minimum from \$5 to \$6. The waiting period during which an injured employee receives no compensation is reduced from 14 to 10 days. The period for which an employer must furnish medical treatment is increased from 14 to 30 days. In case a widow receiving compensation remarries, she would be paid one-third of the compensation due, not to exceed 100 weeks. The method of computing the average weekly wage of an injured employee, as contained in the bill when it was sent to the Legislature by the attorney general, was restored before it was finally passed on the last day of the session.

The Bureau of Rehabilitation is charged with obtaining positions for those who (because of injury) have been incapacitated and whose earning power is reduced. Arrangements will be made with educational institutions for special courses for the injured for which the State will pay not more than \$15 a week for 20 weeks. The bureau will furnish artificial limbs at cost to injured workers and supply special treatment for those physically disabled. Visits will be made to the homes of the injured by agents of the bureau and advice and assistance given.

The fourth administration bill of the compensation class was not pushed and was allowed to die in committee. It would have levied a 2 per cent. tax on the insurance of corporations carrying their own compensation insurance. The bill creating a commission to study industrial accidents was defeated.

All other bills of interest to the mining industry were killed, among them being the Catlin bill, which would allow coal companies to remove coal under cemeteries; the Donnelly bill, which provided that the operators should deliver powder and other explosives at designated places in the mines, passed the House but died in the Senate Committee. A number of other bills pertaining to coal mines were introduced but not reported from committee. The Legislature passed bills giving substantial increases in salaries to the chief of the Department of Mines and to the 54 State Mine Inspectors.

It is learned that the governor is making a careful study of the mining industry and that at the next session of the Legislature he may introduce legislation to enlarge the powers and the scope of the Department of Mines. The governor has signed the bill

creating a bureau to make a geological survey and has approved a bill giving this bureau large funds to carry out its work.

### Charleston, W. Va.

While transportation conditions were somewhat improved in the southern part of West Virginia during the last half of June, yet the operation of mines to full capacity was not possible even where market conditions would otherwise have justified it, owing to the fact that sufficient cars were not available; this was true to a greater extent in the Kanawha than in the New River field. Just at a time, however, when the supply of smokeless coal was being augmented by an increased output, producers of that kind of coal learned of the order of Secretary Daniels virtually commandeering one-sixth of West Virginia's smokeless coal for the navy; this amount is said to be twice as large as the navy has heretofore been using in normal periods. This order which may be in effect for the next six months gives promise of materially shortening the supply of smokeless for general market purposes as well as preventing smokeless producers from selling their coal at prevailing market prices. Little wonder that such producers are up in arms. It means, they assert, that there will be no opportunity to supply either the domestic or foreign markets right at a time when exports are reaching handsome proportions and when, under the allocation of tonnage by the shipping board, it seemed possible to increase export. As is already known, lack of cars interrupted the flow of coal for a time to tidewater as did a strike on the Norfolk & Western R.R. which cost 100,000 tons. But during the third and fourth weeks of June coal was moving more freely, with about three-fourths of such coal going to tidewater, the remainder being divided between Lake points and inland Western markets. It is apparent that there has been a marked increase in the demand for export coal, although just at the present time gas and byproduct coal are coming into their own. The requirements of the United States navy during June have also been unusually large. Labor was somewhat more plentiful during the last half of the month. While prices underwent comparatively little change during the third week of June, there was undoubtedly a much firmer market, at least in so far as West Virginia operators were affected.

After suffering with a severe case of car shortage for several weeks, the New River district was able during the week ending June 21 to make some headway in increasing its production; the influx of additional miners into the district also tended to help production, so that there was fully a 10 per cent. larger tonnage during the third week of June than in the week immediately preceding. It was estimated that many companies were producing 85 per cent. of capacity. What with a growing export demand and the navy using a large tonnage, New River producers are finding it difficult to meet the demand for their coal, the bulk of which is now being shipped to tidewater. In fact only about 25 per cent. is being shipped to Western points including the Lakes. In the open market New River mine-run was selling around \$3.00 a ton and contract \$2.75 a ton. Contract lump and egg were averaging between \$3.25 and \$3.50 a ton.

Little or no progress was made in the Kanawha district in speeding up production, so that the total output was not over 60 or 70 per cent. at the most, making the tonnage produced during the third week in June only about 125,000 and certainly not over 150,000, this being due to a continuation of car shortage. The demand for Kanawha gas coal was stiffening considerably and there was also a somewhat more pronounced demand for ordinary steam coal, which has been lagging behind other coals in recent weeks. In fact the whole West Virginia market was much stronger than it has been at any time this

year, so that operators greatly regretted the handicap of car shortage. The most marked development in the district has been in the steadily increasing shipments of Kanawha coal to tidewater as well as the increasing number of inquiries for this coal to be shipped in the same direction. Kanawha run-of-mine was still averaging during the third week of the month from \$2.00 to \$2.25 a ton.

### Fairmont, W. Va.

While a car shortage began developing about the middle of the week ending June 21, in the northern West Virginia coal fields, it was not until June 21 that the shortage became acute. On that day the number of cars furnished was much below the average number which have in recent weeks been loaded out daily; the only factor which prevented mines from shutting down in many instances was the number of unconsigned cars on hand, but even that number has been reduced to a great extent in recent weeks. As an instance of what the car shortage means, only 740 cars were furnished the mines of the Monongah division of the Baltimore & Ohio on June 21, as against about 900 required daily. The 740 cars furnished was the lowest number since Oct. 31, 1918. The daily average of cars furnished the Monongah division up until the third week of the month was in the neighborhood of 3,000. Placements on the division on June 21 were only 600 cars. While both railroad officials and coal men have been expecting a car shortage, it arrived sooner than anticipated. For a time consumers refused to have coal shipped in gondolas, stipulating that only self-clearing cars should be used, but now consignees have reached a point where they are no longer so particular, so long as they get the coal. The demand for coal produced in the Fairmont and other West Virginia fields is steadily crawling upward to such an extent in fact that "bargain" coal is no longer obtainable and operators who entered into contracts not over 30 days ago to furnish coal at ridiculously low prices are now kicking themselves. Shipments from northern West Virginia points fluctuated in volume somewhat during the third week of the month, but by the end of the week the movement was large, the bulk of such coal going to the East. Shipments to tide dropped off slightly when the Pocahontas mines resumed shipment but by June 21 Curtis Bay was again taking a substantial tonnage. While inquiries for coal for export are daily becoming more numerous, producers find themselves unable in many instances to accept orders for delivery of coal to points where it is a difficult matter to arrange for final delivery. Lake shipments were somewhat larger at the end of the week than at its beginning. Buyers in northern West Virginia fields appeared to be in the market for a large tonnage of low sulphur gas coal and for byproduct coal as well. Resumption of operations at many iron and steel plants in West Virginia it is believed will shortly stimulate coke production.

### Huntington, W. Va.

Reaching an output of 76 per cent. the Logan mining district succeeded during the week ending June 21, not only in producing the largest tonnage of the year, 232,129 tons, but in exceeding the output for the corresponding period of 1918 by almost 1,000 tons. This result was made possible in part by a reduction in the car shortage from 18 to 9 per cent. or from 59,000 to 29,000. In other words, it was cut in half. At the same time there was a further reduction in the no market loss from 39,000 tons or from 12 to 10 per cent. Labor shortage losses were considerably less as were losses from mine disability.

The effect of these reductions was to cut the production loss from 123,000 to 73,000 tons, a difference of 50,000 tons, the

net gain in production for the week being 28,000 tons. In short the car supply was materially improved while market conditions were much better in every respect particularly as to the demand for gas coal. In fact shipments from the Logan district were heavy both to the east and west and an unprecedented run of business is anticipated.

All records for the year 1919 were smashed on the C. & O. railway on coal loading for the week ending June 21. The record for the week was only a shade under the best weeks of 1918, the banner production year for the C. & O.

The comparison of the three best weeks in the history of the railroad is as follows:

July 27, 1918.....	Cars	14,098
July 30, 1918.....	13,749	
June 21, 1919.....	13,735	
New River.....	Cars	3,308
Kanawha.....	2,828	
Coal River.....	1,111	
Guyan Valley.....	4,604	
Kentucky.....	1,094	
Total.....	12,945	
S. V. & E.....	636	
Long Fork.....	133	
A. C. & I.....	21	
Total.....	13,735	

There is every indication that June will be a record breaker. The figure for the first three weeks is high in tonnage and yet another week of loading is to be recorded. The total depends upon the available car supply and the railways are straining every resource to give the mines the number of cars they want.

Coal men see in figures such as those above given the renaissance of the coal industry on a parity with the best war-time period.

### Bluefield, W. Va.

Notwithstanding that the strike of shopmen on the Norfolk & Western has been adjusted evidently that road had not fully recovered from the effects of the strike, for, of a total production loss of 265,000 tons during the week ending June 21 in the Pocahontas district, a car shortage was responsible for 263,000 tons, an increase of 103,000 tons from this cause in a week's time. From 196,000 tons the production of the region was cut down to 156,000 tons, a loss of 40,000 tons in the same period. The total production loss was increased 90,000 tons. There were no other losses to speak of outside of a small mine disability loss, no market losses finally disappearing. Coke production dropped 1000 tons being only 6900 tons for the week.

### Canton, Ill.

The coal mine superintendents of Peoria, Fulton and Tazewell Counties, Illinois, met at this place on June 18 and perfected an organization. The purpose of the organization was to attain a standardization of conditions in the mines of the district in question; to establish closer relationship with the miners; to produce a better and cleaner coal, and to meet for discussion of mining matters. It is the intention to extend the membership to include the mine managers. This association will meet again on July 23 and will hold meetings regularly each month. The first meeting was quite successful and the 28 superintendents attending were most enthusiastic. The following officers were elected: President, T. M. Guthrie, superintendent Silver Creek Colliery Co., Farmington; vice president, H. Wilkinson, superintendent Groveland Coal Mining Co., Peoria; secretary-treasurer, Deamev, superintendent Crescent Coal Co., Peoria. The meetings are intended to have an educational benefit in the discussion of such articles as "Preparation of Bituminous Coal," a series started in the May 22, 1919, issue of *Coal Age*, and other subjects which have a bearing on the work with which the superintendents are connected.

### PENNSYLVANIA

#### Anthracite

**Fort Blanchard**—Fire of unknown origin destroyed the new washery at the No. 14 colliery of the Pennsylvania Coal Co., at this place.

**Ashland**—An explosion of gas at the Potts colliery of the Philadelphia & Read-

ing Coal and Iron Co., on June 21, resulted in the death of two miners, and the injury to several others.

**Hazleton, Penn.**—Many of the foreign mine workers in the Lehigh region deposited their hoarded earnings in banks during the past week—savings made during the war period. These are said to have increased bank deposits to the largest amount in the city's history.

**Duryea**—The electric storm of June 24 did considerable damage to the washery of Nos. 8 and 9 collieries of the Pennsylvania Coal Co. The large conveyor line running to the washery, as well as one side of the building itself, were blown down entailing a loss estimated at thousands of dollars. It is the intention of the company to immediately rebuild that portion of the washery that has been damaged.

**Wilkes-Barre**—The Lehigh Valley Coal Co.'s mine foremen and assistant foremen have been informed that they can expect a ten days' vacation this year. The practice of giving summer vacations to the salaried men was discontinued during the war.

The coroner's jury investigating the cause of death of 92 men in the Baltimore Tunnel on June 5 after hearing a large number of witnesses brought in its verdict on June 25. This jury refused to fix blame for the accident upon any person or persons. It did, however, make certain definite recommendations for future legislation. An account of the disaster with all pertinent obtainable details as brought out at this coroner's inquest will be printed in the next issue of *Coal Age*.

### Bituminous

**Plumville**—The Consolidated Coal and Coke Co., of this place, is now building a tippie at this new mine and equipping it with machinery furnished by the Fairmont Mining Machinery Co., of Fairmont, W. Va. It is expected that the improvements will cost \$30,000.

**Dunbar**—The work of rebuilding the tippie at the Freemont No. 2 mine of the American Manganese Co., at this place, recently destroyed by fire, has been commenced. Gangs are working overtime on the job and it is expected that the mine will be able to resume in the latter part of July.

**Brownsville**—Extensive repairs are being made to Lock No. 5 in the Monongahela River at this place to accommodate the rapidly increasing river traffic in coal due to the development of fields in Greene County and the upper pools on the Fayette County side. New gates are being installed and machinery repaired.

**Uniontown**—An attempt was made to blow up the tippie of the Peerless works of the J. M. Grey-Kramer interests shortly after a reduction of wages was put into effect. The dynamite was misplaced, however, and only slight damage resulted. The plant had been closed for repairs and had only just been reopened to fill recent orders.

**Pittsburgh**—The Bureau of Mines and the Carnegie Institute of Technology have arranged jointly for the erection of a research laboratory. Its principal initial use will be to test a new furnace designed to eliminate the smoke of the usual type. The laboratory will be erected between the Tech machinery hall and the power plant of the Bureau of Mines. All necessary equipment to carry on the experimental work will be supplied to test the new furnace which can be used for gas or all grades of coal, interchangeably.

### WEST VIRGINIA

**Kanawha City**—Charleston parties will develop a coal tract in Loudon district, Kanawha County, near here. They have chartered the Kanawha City Coal Co. for the purpose, with a capitalization of \$50,000. The incorporators are R. E. Whittaker, A. O. B. Hogue, F. C. Koper, D. P. Reed and C. J. Cunningham, all of Charleston.

**Barnstown**—Fire, caused presumably by a short circuit in the dynamo room of the power plant of the old Barnstown shaft mine of the Consolidation Coal Co., resulted in a \$10,000 property loss and a shutdown of the mine for a few days. The power plant was completely destroyed and a portion of the tippie was burned. The efforts of firemen saved the main part of the tippie and also prevented the flames from spreading to the mine.

**MacDonald**—A coal land deal which has been under negotiation for several months has been closed. Under its terms the New River Co. adds 6500 acres to its 100 sq.mi.

of New River coal territory. The new acquisition is that of the Keefer Coal and Coke Co. holdings and the price paid was \$324,855.25. The lands conveyed were those acquired by a Mr. Keefer, a Pittsburg capitalist, from E. B. Hawkins in 1908. The purchase price at that time was \$35 an acre. The New River Co. pays \$56 an acre.

**Clarksburg**—The Hudson Coal Co., a recently organized concern, acquired all the coal holdings of the Prunty Real Estate and Coal Co., including three mines in this section. The Hudson company is capitalized at \$1,000,000 and is said to contemplate extensive development of its coal properties. The Lewis mine at Reynoldsville, the most important of the group, taps 1004 acres of Pittsburgh seam coal; a new steel and concrete tippie will be built, to have a capacity of 2500 tons a day. The Miller mine at Wilsonburg, with a 1200-ton capacity, and the Tucker and Betty mine near Fairmont are the other properties taken over by the Hudson company. J. M. Orr is vice-president and general manager.

**Williamson**—Quite elaborate preparations were made by the operators of the Mingo field for the meeting and banquet of the Williamson Operators' Association held here on June 26. A number of invited guests were present among them being Governor John J. Cornwell, of West Virginia, Congressman John W. Langley, of Kentucky, and T. L. Lewis, secretary of the New River Operators' Association. The officers of the association are: G. S. Patterson, Vivian, president; W. N. Cummins, Red Jacket, vice president; L. E. Armentrout, Borderland, treasurer; George Bausewine, Jr., Williamson, secretary. On the board of directors are Messrs. Patterson, Cummins, Armentrout, Morris Watts Eckman; A. R. Meisel; W. A. Hurst, Williamson; H. G. VanHoose, Majestic, Ky.

**Beckley**—Since the first ton of coal was mined by the E. E. White Coal Co. in West Virginia more than 5,000,000 tons in all have been mined by the company. In fact according to statistics prepared by it there has been produced at the Glen White mine 2,959,006 gross tons and at the Statesbury mine 2,043,746 tons or in all 5,002,752 gross tons.

### ILLINOIS

**Springfield**—Mine rescue teams from all parts of the state will compete at the arsenal here September 7-19. The five teams making the best showing will represent Illinois at the national contest to be held in Pittsburgh the latter part of September. Plans for the state contest were outlined by Director J. C. Thompson of the department of Mines and Minerals. The federal mine rescue car was stationed here recently for a few days, demonstrations being made for the benefit of the public.

**La Salle**—The Marquette mine, one of the landmarks of eastern Bureau County, is being dismantled and the buildings and other material sold. This property was considerably damaged by fire a few years ago and has not been operated since that time. The coal rights on the south side of the Illinois River are said to have been sold to the La Salle County Carbon Coal Co., whose property adjoins, and a new shaft may be sunk on the Putnam County side of the river.

### MONTANA

**Fromberg**—The Equity Coal Co. has leased lands near here and it is stated will make preparations for an active campaign this year. A new tippie is being built and a side track constructed. W. E. Plinkney, president of the company, states that a six-foot seam of coal is being developed and that shipments of coal should be made by fall.

### ALABAMA

**Birmingham**—The first shipment of coal started down the Warrior River early in June under the new tariff sheet of the Railroad Administration. This shipment included 2000 tons of coal from the Lipsey mines. While the rate is the same as that of the rail route, loading and unloading of the coal is absorbed and storage room for the coal is furnished free at New Orleans on these shipments. The development of the terminals is being pushed; the terminals, together with the railroad connection of the river and the city costing upward of \$1,000,000. The river at Mobile is to be dredged for further depth, a 30-ft. channel being sought. The object of these developments is to facilitate the export of coal from the mines of the Birmingham district.



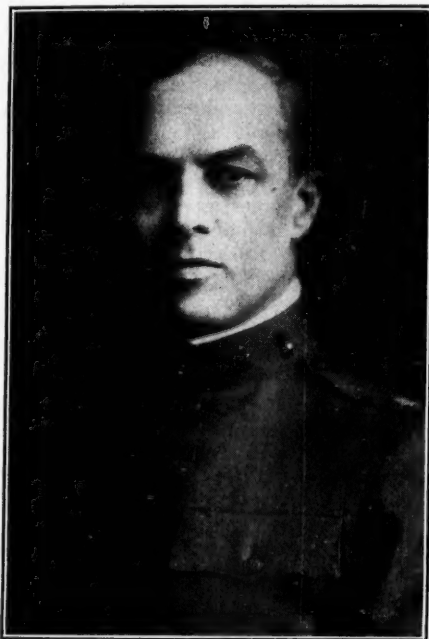
## Personals

**A. D. Robinson** has been appointed manager of the tidewater sales office of the Fayette Smokeless Fuel Co., at Norfolk, W. Va. For the last six years he has been connected with the general office of the company at Mt. Hope, W. Va.

**C. F. Bashore** has been placed in charge of the operations of the Randal Coal Co., on Scott's Run in West Virginia, as manager. Until recently Mr. Bashore was the superintendent of the New England Fuel and Transportation Co. at Grant Town, W. Va.

**Dr. J. B. Umbleby**, of the U. S. Geological Survey, returned recently from Europe where he was called to advise the peace commissioners upon the mineral resources of Germany and the German colonies. He related evidences of the grave danger to Europe from coal famine, citing the reduced production in several countries from labor disturbances.

**Major Charles E. Sholes** has recently been elected vice president, director and general sales manager of the Edison Storage Battery Co. Major Sholes succeeds Harrison G. Thompson, who resigned to organize and conduct the Transportation Engineering Corporation, of New York. Major Sholes has heretofore been identified with the construction, operation and



CHARLES E. SHOLES

management of chemical industries; he was the active member of the creditors' committee of the Aetna Explosives, Inc., during the receivership, which is ending so creditably. During the war he served as major in the ordnance branch of the service. He is honorary chairman of the Society of Chemical Industry and a member of many other scientific societies.

**A. R. Montgomery**, who for several years has been the general superintendent of the Boone County Coal Corporation, with headquarters at Clothier, Boone County, W. Va., has resigned to locate in Peoria, Ill., where he will, with others, engage in a general road contracting business. Inasmuch as he is leaving West Virginia he has also tendered his resignation as a member of the state senate, to which he was elected in 1916.

## Trade Catalogs

**Producer Gas Costs.** Steere Engineering Co., Detroit, Mich. Pp. 1; 9 x 11 in.; unillustrated. Table on cardboard for hanging up.

**Link-Belt Locomotive Cranes.** Link-Belt Co., Chicago, Ill. Book No. 370. Pp. 68; 6 x 9 in.; illustrated. Description of locomotive type of crane and copious illustrations showing installations in various industries.

**Standard Reinforced Spiral Pipe.** Standard Spiral Pipe Works, Chicago, Ill. Catalog No. 7. Pp. 40; 8 x 10 1/2 in.; illustrated. Notes details of construction and cites installation of spiral pipe and various fittings and supplies.

**Direct Current Motors and Generators.** Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 1096-A. Pp. 20; 8 x 10 1/2 in.; illustrated. Description of types "K" and "KC" and application to various industries noted.

**Copes System of Boiler Feed Control.** Northern Equipment Co., Erie, Penn. Bulletin. Pp. 8; 8 1/2 x 11 in.; illustrated; convenient for filing. A proposal and specifications for the Copes system of boiler feed regulation.

**Whiting Railroad Equipment.** Whiting Foundry Equipment Co., Harvey, Ill. Catalog No. 145. Pp. 36; 8 1/2 x 11 in.; illustrated. This publication brings before railroad men the advantages and labor saving features of the company's various railroad specialties such as screw jack hoists, cranes, etc.

**Imperial Incandescent Headlight for Mining Locomotives.** Ohio Brass Company, Mansfield, Ohio—exclusive sales agents. Crouse-Hinds Co., Syracuse, N. Y.—manufacturers. Bulletin No. 202A. Pp. 12; 6 x 9 in.; illustrated. Describes the various types of headlights made by the Crouse-Hinds company, also other allied equipment—headlight parts listed.

**Works and Products.** Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 137. Pp. 62; 5 x 6 1/2 in.; illustrated. A description of Allis-Chalmers company and its capacity for producing a great variety of machinery including some of the largest and most powerful prime movers and electrical machinery in the world—details of the company's plants and products.

## Industrial News

**Lackey, Ky.**—The Wells-Elkhorn Coal Co., C. O. Messenger, manager, Paintsville, plans development on 2000 acres, with daily capacity of 20 cars.

**Ambler, Penn.**—The Eastern Foundry and Machine Co. is now operating its new plant at this place. The general sales office of this company is in the Liberty Building, Philadelphia, Penn. B. M. Morrison, general sales manager.

**Boston, Mass.**—Frederick & Co., Inc., of this place has an option on 1200 acres in the Fairmont field, near Farmington, W. Va. and has incorporated with a capital of \$1,500,000. Fred A. Sesler, of Wilkensburg, Penn., is at the head of the enterprise.

**Chattanooga, Tenn.**—A large coal deal was consummated in east Tennessee recently when the Montlake Coal Co. was absorbed by the Buck Creek Coal Co., an organization capitalized at \$350,000. The new company has acquired 25,000 acres of land around Buck Creek Gulch.

**Edwardsville, Ill.**—Edward Gaertner, of Pittsburgh, has taken options on 12,000 acres of coal lands in this vicinity. He is understood to represent Pittsburgh capitalists who contemplate opening a large mine on the northern edge of the town. It is announced that test borings will soon be made.

**Sharples, W. Va.**—The Boone County Coal Corporation has purchased the stock of the D. C. Thomas Coal Co., of Columbus, Ohio, and has transferred the property to the first named corporation. The D. C. Thomas Coal Co. is now in process of dissolution. The Boone County Coal Corporation is a large producer of Chilton coal, used for byproduct and gas purposes.

**Columbus, Ohio.**—F. E. Falk, head of the Falk Coal Co., of this place, has acquired all of the capital stock of the Penn-X mine, located at Orbiston, near Murray City. He expects to improve and operate the property, which consists of a large acreage of virgin coal. The selling offices will be in Columbus. The mine was formerly operated by the Western Fuel Co., of Nelsonville.

**Crellen, Md.**—The Turner Douglas Coal Co., Goff Building, Clarksburg, W. Va., is understood to be planning for the development of additional coal properties in the Crellen district. In connection with its present holdings comprising about 340 acres. It is proposed to have a daily ca-

capacity of about 500 tons. W. B. Carmichael, 420 Stark Street, Saginaw, Mich., is manager.

**Carpenter Creek, Mont.**—The Montana-Wyoming Coal Co. expects to exercise its option and purchase lands near here. The property is said to be underlaid by a nine-foot seam of coal which will be developed. When the lines of the Montana Power Co. are extended to this place, it is stated that the development of the several coal properties here will be on a larger scale than at present.

**Charleston, W. Va.**—There is to be further development of coal lands in the Loudon district of Kanawha County by the Kanawha City Coal Co. just organized by Charleston people. This company has an authorized capital of \$50,000 and its plant will be near Kanawha city. Leading figures in the formation of the new company were D. P. Reed, C. J. Cunningham, F. C. Koper, A. O. B. Hogue and R. E. Whittaker, all of Charleston.

**Erie, Penn.**—The Ball Engine Co. of this place, builders of the Erie steam shovel, let a contract on June 18 for building an addition to their shovel erecting shop. The new building will be approximately 175 by 125 ft., which will nearly double the present area and capacity of the shop in question. Other additions to the Erie shovel plant, totaling \$350,000, are contemplated, as present business warrants further extensions.

**Charleston, W. Va.**—Charles Willis Ward and wife deeded to The Kelly's Creek Collieries Co. a one-sixth interest in a tract of 8000 acres located on Kelly's and Hughes Creeks both of which are tributaries of the Kanawha River.

The other five-sixths of the tract are still held by members of the Ward family, it is stated, though an effort has been made by the owners of the Kelly's Creek company to purchase the entire tract. The price paid for the interest sold was \$115,000.

**St. Louis, Mo.**—The Phillipsburg Mining Co., with offices in the Security Bldg., here, is making extensive developments at its mines in Montana to determine as to the condition of the coal at lower levels. The shaft, which is to be sunk to a depth of 1000 ft., is now down about 650 ft. The company expects to expend \$100,000 for development and for additional equipment including a hoist. J. P. Meyer is president and Engineer McCracken has charge of operations.

**New York, N. Y.**—W. N. Brown, an examiner of the Interstate Commerce Commission, began a series of hearings in the question of demurrage charges on June 26. These hearings were arranged by Charles S. Allen, secretary of the Wholesale Coal Trade Association, of New York City. In the meantime the Railroad Administration has agreed to suspend the collection of all unpaid demurrage charges which have accrued on coal at the local ports between December 1 and May 1 until the Interstate Commerce Commission decides whether a reduction of the present rates is possible. These unpaid bills at this port to date are believed to total about \$223,000.

**Knoxville, Tenn.**—Plans are now under way for forming an export corporation with a capital of from \$500,000 to \$1,000,000 for shipping coal to Latin-America and to Europe.

The Southern Appalachian Coal Association, national banking interests and the Manufacturers' Association of America are promoting the enterprise. It is stated that New York bankers who have investigated the opportunities for shipping coal to foreign countries have agreed to finance the corporation.

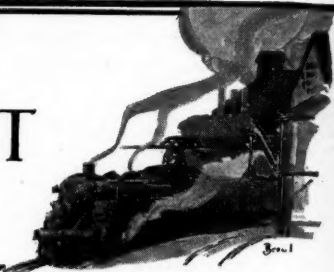
This corporation will handle bunker and export coal from the southern Appalachian fields.

**Salt Lake City, Utah.**—Consolidation of the Eccles and Wattis coal interests is to be perfected in the near future according to report. The new concern, which will be known as the Lion Coal Co., is expected to have a capitalization of \$5,000,000. Among the incorporators are David Eccles, president of the Eccles estate, W. H. and E. O. Wattis, of the Utah Construction Co. and M. S. and J. M. Browning, the inventors of the machine gun of that name. The property of the new company will include the Wattis interests in Carbon, representing over \$1,500,000 and the Eccles interests in Wyoming, valued at more than \$2,000,000. The combined output of the two companies is estimated at 600,000 tons. D. H. Pape, general manager of the Eccles coal interests, will assume the management of the new company. J. H. Hill will act as sales manager of the new corporation.



# MARKET DEPARTMENT

EDITED BY ALEX. MOSS



## Weekly Review

*Public Will Have Itself to Blame for Coal Scarcity This Fall and Winter—Necessity Exists for Speeding Up Soft Coal Output—Anthracite Coals for Domestic Purposes Are Scarce, While Steam Coals Are Drug on Market*

**N**O CONSUMER of bituminous coal can blame anyone but himself if he fails to obtain sufficient coal for use this fall and winter. Everything possible is being done by both producers and dealers to acquaint the public with the true state of affairs insofar as coal is concerned.

If a coal shortage is to be averted this year, consumers must buy their fuel now, for in order to meet the estimated requirements of the country, which are placed at 530,000,000 net tons for the year, the production of soft coal must be increased 2,775,000 net tons each week for the next thirty weeks; in other words, an output of 10,900,000 net tons weekly.

During the week ended June 21 the output of soft coal totalled only 8,689,000 net tons. At this rate, which has been maintained since the middle of May, the production of bituminous is about neck and neck with the rate of consumption. There is no reserve being built up. Labor shortage and car

scarcity are even now affecting the output of soft coal, and these handicaps will become even more evident as the weeks go by. The time to buy coal is now.

The undertone to the soft coal market is decidedly more encouraging. The select grades of bituminous coal are not easily obtainable, while prices on the better grades are going up. Steam coals are moving slowly. In the Middle West many operations are forced to close down for days at a time, owing to the inability to dispose of the small sizes.

If anything, consumers are more eager just now to procure the domestic sizes of anthracite. So insistent are the requests for stove and egg coal that some producers are breaking larger coals into these two sizes in order to appease the trade. The product of the so-called Independent operators is bringing premiums on prompt shipments of hard coal to the West and to Canada, while the large companies are

adhering closely to their regular schedule. This called for another advance of ten cents a ton on egg, stove, chestnut and pea coals on July 1, and the prices on these coals at the mine are accordingly that much higher. Chestnut is becoming increasingly hard to obtain, though the shortage of this size is not so evident as on the egg and stove sizes.

Contrasted with the activity in the demand for domestic coals is the utter lack of interest shown in the anthracite steam coals. Buckwheat, however, is moving somewhat more easily than either rice or barley. Prices have been cut on the two latter sizes.

During the week ended June 21 the anthracite operators produced 1,748,000 net tons of coal, a gain of 63,000 net tons over the output of the week ended June 4. For the calendar year to June 21 the production of anthracite is estimated at nearly 37,000,000 net tons, or about 10,000,000 net tons below the output of the corresponding period of 1918.

### WEEKLY COAL PRODUCTION

A slight increase in the production of bituminous coal in the week ended June 2, but a decrease compared with the week ended June 7, is indicated by the latest estimates. The production in the week ended June 21 was 8,689,000 net tons compared with 8,487,000 net tons in the week ended June 14 and 8,927,000 net tons in the week ended June 7. The uniformity in the rate of production in the last seven weeks, or since the middle of May, the production averaging around eight and three-quarter million net tons per week, is noteworthy. The evidence available indicates that this represents the rate of consumption at the present time and that little or no stocking is taking place. The production for the calendar year to June 21 is estimated at 203,434,000 net tons, and is nearly 70,000,000 net tons or 26 per cent. below the production in 1918.

The production of anthracite for the week ended June 21 is estimated at 1,748,000 net tons, a gain of 63,000 net tons over the week ended June 14, but a decrease compared with 2,034,000 net tons for the corresponding week of last year. The production of anthracite for the calendar year to June 21 is estimated at nearly 37,000,000 net tons, or about 10,000 net tons below the production for the same period in last year.

Returns from operators for the week ended June 14 show that the drop in production that week compared with the week ended June 7 was due to an increase in loss because of no market from 32.1 per cent. to 34.7 per cent. which occurred mainly in Illinois, Indiana, southern Ohio and western Kentucky, and in part to an increase in the loss of running time because of car shortage, notably in the Pocahontas

and high volatile fields of southern West Virginia.

The production of beehive coal in the week ended June 21 is estimated at 285,140 net tons compared with 285,688 net tons in the week ended June 14 and 633,162 net tons in the week ended June 22, 1918. The production of beehive coke in the calendar year to date is estimated at 9,323,000 net tons compared with 14,526,400 net tons for the same period in 1918.

Bituminous coal dumped at lower Lake Erie ports in the week ended June 14 was 959,265 net tons compared with 1,073,952 in the week ended June 7 and compared with 912,954 net tons in the week of June 15, 1918. This season to date the dumpings aggregate 7,076,328 net tons, or 1,200,000 net tons greater than last year.

### BUSINESS OPINIONS

**The Iron Age**—Production is now at about 60 per cent. of ingot capacity, and June's output will probably be fully 10 per cent. more than May's. The greater activity in pipe, wire and sheets is offset by the still relatively small demand for bars, plates and shapes. Orders are coming in faster than the shipment rate, and some accumulation of bookings is the tangible evidence of the continued improvement. Large sales of coke for last-half delivery have been made in the Pittsburgh district, and prices are stiffer, with foundry coke 25c. higher.

**Dry Goods Economist**—The movement of practically all lines of seasonable goods in dry goods and department stores continues excellent in every section of the country. Roadmen are sending in a continuous stream of orders accompanied by optimistic statements regarding the conditions they

find in their respective territories. Scarcity is the rule in woolen and worsted dress fabrics. This is due in part to the lack of wools earlier in the season, and also to problems of manufacture. Stocks of both manufacturers and distributors are light, but there is no absolute famine as some people have asserted.

**American Wool and Cotton Reporter**—It is not expected that any decline in the wool market will take place this year, and the general outlook for business seems good for a long time ahead. It is predicted that as the season progresses the market will stiffen rather than otherwise. The general trend of the trade is to sell as fast as possible. Mills are ready to buy, and they want wools for immediate consumption. The cotton market during the week under review has been the quietest for some time. The cotton goods market has been somewhat disturbed by the slow production of mills. Many mills are so closely booked ahead that they will be unable to complete present contracts until late fall.

### Atlantic Seaboard

#### BOSTON

Signs of output falling behind. Prices, however, without material change. Buyers show more interest in current market. Rejection of Navy bids leaves many shippers "in the air." Lack of contract orders may mean steady supply of spot coal later. Hampton Roads coals without new developments. Receipts on same basis as for several months. Anthracite demand still insistent.



**Bituminous**—More and more is being heard of cases where operators are obliged to decline business because they are unable to produce coal fast enough to meet the current demand. This is especially true of operations where mining is more difficult. Mine workers show no disposition to leave places where the seams are thin in favor of mines carrying thicker veins, and this shifting of labor, particularly in central Pennsylvania, is already causing a lot of anxiety.

The long expected upward swing in prices, however, is not in evidence. A few shippers of quality coals have made spot sales at slightly higher prices for July than for June, but the market is still heavy and labors under the conditions that prevailed all through the spring. There has been so much anxiety to sell coal since January that buyers find it very hard to understand the present drift and the prices now asked for deferred delivery. This territory, therefore, is still very slow responding. While a good many interests have stopped selling there are yet enough who are eager to take on spot business to give the impression that conditions continue practically the same. The result is that prices remain about on the same level as a fortnight ago.

There is distinctly more interest, however, on the part of buyers than was the case a month ago. The textile mills are seeing farther ahead and are more inclined to take on coal for the winter months. In some directions there has been something of a spurt on this account and the current market is that much improved. It has been only within a few weeks that some of the large manufacturers who accumulated heavy stocks last year began taking enough coal to meet boiler requirements from week to week, and now the same people are showing their inclination even to stock coal on top of the reserves they have been carrying.

For many of the Pennsylvania shippers the outlook has become further complicated through the rejection of bids submitted to the Navy Department. They are still unable to get from the authorities the approximate shipments they will be called upon to furnish. In other years there were few of the Pennsylvania coals certified for Navy use, but now that the number of mines on the acceptable list has been greatly enlarged it is impossible to figure the outcome.

Should output show an increase between now and October, and there are many who think it will, it will be shown that operators have taken far less contracts than usual. It is quite possible that there may then be a steady supply of spot coal at prices not much higher than the present range, for the fact that the coal people have avoided contracts to a considerable extent may easily mean that coal will not be so hard to get as many have predicted. New England is not likely to increase very much its present requirements, at least not between now and Jan. 1, and unless output is to be reduced the boom market will have to be the result of increased needs in other parts of the country.

This is perfectly true in the case of the smokeless coals that have their largest outlet through Hampton Roads. Improved conditions as to price, etc., will be the reaction of the export or bunker trade, rather than from any marked influence of buying in this territory. Now that peace is actually signed it is likely there will be rapid developments the next few weeks as to the volume of coal for Italy and other countries, but so far there has been ample coal for all comers. Prices have been firmer on the basis of \$2.75 per net ton f.o.b. mines, this being the figure at which coal is now being taken for use of the Navy, but spot sales for New England are still few and far between.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons....	\$2.15@2.75	\$2.75@3.35
F.o.b. Philadelphia, gross tons.....	4.27@4.95	4.95@5.50
F.o.b. New York, gross tons.....	4.62@5.29	5.29@5.85
Alongside Boston (water coal), gross tons.....	6.10@6.85	6.90@7.35

Gas slack from the Greensburg district is quoted at \$1.60@1.75 per net ton, with 25c. more for gas nut and slack.

Georges Creek is still quoted at \$3.20 per net ton f.o.b. mines.

Poahontas and New River are being quoted at \$5.04@5.24 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from \$7.24@7.44, and on cars Boston and Providence at from \$7.50@7.90 per gross ton, the latter being the contract price f.o.b. cars for deliveries to Apr. 1.

**Anthracite**—There is no let-up in the demand for domestic sizes. All the regular shippers are swamped with orders, and if certain independent operators are not selling in advance it is because they are hoping for higher spot prices later. The movement of anthracite barges is much hampered by restrictions of one kind and another, and many of the coal factors are looking forward longingly to a time when the railroads will be returned to private control and normal policies can be pursued without undue interference. It is plain, also, that the average householder is trying to put in more coal than ever before. The retail demand in the cities, especially, shows no signs of relaxing and there continues a tremendous pressure from all quarters to get coal forward. Without doubt this demand will continue through to next April. There are a few hopeful shippers who feel that the demand is sure to ease up later on, but experience shows that once there develops the usual fall demand from centers like New York and Philadelphia the chances for New England supply are materially diminished.

#### NEW YORK

Demand for domestic coals shows no signs of letting up. Some companies are breaking broken coal to relieve the other sizes. Chestnut coal becoming scarcer. Pea in good demand along the line. The buckwheats showing up better. The bituminous situation shows slight improvement. Contract coal moving rapidly but spot demand is slow. Tradesmen continue to be optimists.

**Anthracite**—The call for the domestic coals continues insistent and, if anything, it appears as if the scarcity is becoming more acute. That no let-up in the call for stove and egg is expected may be taken from the attitude of some of the companies who are breaking broken size into the next two smaller coals.

In this city the retail dealers complain more of the lack of coal than of the lack of orders. The latter, however, were not received as early in the season as usual because of the belief there would be a reduction in the price of coal and on that account dealers were not able to begin their spring deliveries as early as they have been in the habit of doing. Now everybody wants their coal immediately, but the dealers are not able to obtain it from the producers.

Another factor in the local situation last week was the partial tie up of tugs and boats which, however, was shortlived, the men claiming that their employers were not living up to the new agreement recently adopted. However, there was a shortage of boats carrying around 500 tons and some shippers found it difficult to procure such boats for their business.

While not so much has been heard locally of premiums to be paid and offered for so-called independent coal and for quick deliveries, there were reports of premiums being offered for quick shipments to the West and to Canada. The large companies are sticking close to their regular schedule, which was advanced 10c. per ton for egg, stove, chestnut and pea coals on July 1. Although the demand for chestnut is not so strong as for egg and stove, it, too, is becoming short.

Pea coal is in much better demand along the line than in this city, and for that reason the shippers are curtailing shipments to this market as far as possible. However, dealers here are taking a goodly proportion of the output if they can secure some of the larger sizes as well. It is said that some of the companies are storing large quantities of pea coal.

The anthracite steam sizes are in no demand. Buckwheat is moving a trifle better than either rice or barley. There are reports that prices are easy for the two latter sizes.

Current quotations, white ash, per gross ton at the mines and f.o.b. at tidewater, at the lower ports, according to company schedule, are as follows:

	Mine	Tidewater
Broken.....	\$5.95	\$7.80
Egg.....	6.15	8.00
Stove.....	6.40	8.25
Chestnut.....	6.50	8.35
Pea.....	5.10	6.85
Buckwheat.....	3.40	5.15
Rice.....	2.75	4.50
Barley.....	2.25	4.00

**Bituminous**—The situation here is more encouraging, but so far the movement has not gained. However, the general situation appears to be improved and the trade is hopeful.

As with anthracite, users of bituminous are being urged to buy now while trans-

portation facilities are good. Consumers are being told that production is about on a basis of what it was in 1910 and that this indicates a shortage of about 40,000,000 tons. Another factor that should be considered by the public is the vast number of mine workers who have gone back to their native country, many of whom will never return here to work in the mines. Hordes of these foreigners are taking with them their savings of the past four years, and until the tide of migration sets in their places will remain unfilled. Efforts are being made to reduce this tide of emigration but now with the peace treaty signed the authorities may find it hard to unearth any means which might put a temporary stop to the outgo. This condition has struck the bituminous fields worse than the anthracite, and the operators are complaining seriously of the lack of labor. They also call attention to the difficulty that might be experienced if there was a heavy demand for coal now. As it is the mine workers prefer to take things easy, working only when they please and remaining at home when they desire.

A feature of the market is the heavy shipment of contract coal, which has gone a long way toward keeping the stocks at the local docks down. It is also noticeable that many dealers who could receive their coal supplies by water are giving preference to all-rail shipments, although the cost is greater.

Following are quotations on various coals, per net ton at mine:

South Fork (Best).....	\$2.95@3.25
Cambria (Best).....	2.75@2.95
Cambria (Ordinary).....	2.35@2.50
Clearfield (Best).....	2.75@2.95
Clearfield (Ordinary).....	2.35@2.50
Reynoldsville.....	2.50@2.75
Quemahoning.....	2.75@2.95
Somerset (Best).....	2.75@2.95
Somerset (Poor).....	2.15@2.35
Western Maryland.....	2.25@2.50
Fairmont.....	1.75@2.00
Latrobe.....	2.10@2.25
Greensburg.....	2.25@2.35
Westmoreland & in.....	2.60@2.75
Westmoreland run-of-mine.....	2.35@2.50

#### PHILADELPHIA

**Anthracite** demand continues heavy. Local receipts light. Egg very scarce, with stove in chief demand, nut hard to get, but pea plentiful. School closing makes some customers anxious for fuel. July company increase in effect. Individuals all ask advance over circular. Retailers face increased costs. Advertising campaign continued. Bituminous holding ground. Good grades stronger. Slight price changes.

**Anthracite**—There is not the least slackening in the demand for coal of the domestic sizes in this market. Unfortunately for the dealers, the shipments since the early part of the month have been most meager. Among the retailers the general impression is that the companies are shipping heavily to the West, especially to districts which were entirely restricted from receiving hard coal last year.

The demand continues to center on the three domestic sizes—egg, stove and nut. The situation as to egg is really remarkable and no one in the trade can recall a time when the call for this size was so heavy. Heretofore on such trade as the dealers had for this size they simply filled at their leisure, feeling they could get it at any time they wanted it or had time to make delivery. Usually after the April reduction, when coal was at its lowest, the retailers delivered the largest proportion of this coal.

Now this is all changed, and the dealers are being hard pressed by their customers for this size. If anything, the anxiety of the trade to get stove coal has increased and many yards are entirely empty of this size, closely followed by nut; as a matter of fact there are occasional instances where dealers are more anxious for nut than for stove.

As has been the case for the past two weeks all dealers are well supplied with pea coal, with most of them adding more to their stocks than they are turning out. No one shows any desire to stop shipments of this size, for they fully realize they will have a demand for every pound they can tuck away in their yards.

Concurrently with the increase in the company circular the individual shippers maintained the relative increase above this circular, until all the smaller companies are now asking premiums on family sizes except pea. During the past week the most conservative firm among the independent shippers sent out a notice to its customers that the July prices would be 15c. higher than company coal. In addi-

tion to this it is the general impression that the smaller shippers are getting even higher prices in outside markets, which would seem to account for the small receipts by their customers in this city.

Despite all their efforts to increase production we have been informed by representatives of the big companies that they are still unable to approach the maximum of last year. All mines could use many more inside workers, and even many of the men who are working have no particular incentive to turn out a heavy production. They have been running under high pressure for such a long time that they seem inclined to ease up, at least that is the opinion of a very well informed operator. As winter approaches they have hopes that much of this lethargy can be overcome, but they are then faced with the likelihood of a car shortage. All of these facts are coming to the attention of the general public and at this time is stirring them to renewed energy to have their coal put in now.

The retail trade is also having some anxious moments in regard to a possible increased cost in the delivery of their coal due to the demands which drivers are making in various sections of the city. At this time it cannot be seen how an increase in wages can be avoided, and the retailers dread adding anything to the retail price of coal, especially in mid-summer. If this increase can be staved off until late fall most of them will be satisfied.

In the hopes that they will soon receive greatly augmented tonnages all the progressive dealers are continuing their advertising, urging consumers to put in coal this summer. Even with the tonnage already placed and delivered, there still remains a large percentage of summer business that has not come in and must be cared for before it can be said that the city will be entirely out of danger of a fuel shortage next fall and winter.

It is believed that in the steam coal buckwheat No. 1 has gained some strength recently, and so far as we can learn no large company is compelled to place any of this size in storage. Of course, there may be occasional cars, but on the whole it can be said that the entire production is being absorbed and the indications are that within a few weeks the demand will be greater than the supply. There has also been a slightly better movement of rice, but heavy quantities of this size still continue to move toward the storage yards. Barley is also being stored heavily and there has been no perceptible change noticeable in this size for weeks, nor is there expected to be for some weeks yet. From those concerns who are anxious to make broken coal for manufacturing purposes comes the report that there is much strengthening in this size, which can be traced to improvement in the iron trade.

As to the matter of collections, all shippers report improvement in this respect, and while the conditions have not as yet approached those of war times, it is only a question of a month or six weeks until all shippers will require exact compliance with their terms by shutting off shipments.

With the increase of 10c. per ton on July 1 the prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

Line Tide	Line Tide	Line Tide	Line Tide
Broken.....\$5.95	\$7.80	Buckwheat.....\$3.40	\$4.45
Egg.....6.15	8.00	Rice.....2.75	3.65
Stove.....6.40	8.25	Boiler.....2.50	3.50
Nut.....6.50	8.35	Barley.....2.25	3.15
Pea.....5.10	6.70		

**Bituminous**—The soft-coal trade holds its own quite well. Of course, the average working time is only about 50 per cent., but the production mined is well taken care of. A significant straw lately is that there has been an occasional report of a car shortage here and there in the region. Producers hesitate to predict what the situation will be in the fall when the railroads will be feeling the impetus of crop movement and renewed industrial activity. The real demand just now is for the high-grade coals, and the price position of such coal has improved to some degree. The demand for prompt shipment is really less than the supply. There is much spot coal offered of the ordinary grades and some fair movement of the same. While the general situation is not near what could be wished for, it is still believed that the tendency is toward improvement and that not far distant. Operators are not at all anxious to contract their output, many of them signing up for only 60 per cent. of their capacity.

With slight price changes recently the quotations ruling in this market are about as follows:

Georges Creek Big Vein.....	\$2.95 @ \$3.05
South Fork Miller Vein.....	2.95 @ 3.05
Clearfield (ordinary).....	2.70 @ 2.85
Somerset (ordinary).....	2.65 @ 2.75
Fairmont Lump.....	2.50 @ 2.60
Fairmont mine-run.....	2.35 @ 2.50
Fairmont slack.....	1.90 @ 2.05
Fairmont lump (ordinary).....	2.25 @ 2.35
Fairmont mine-run (ordinary).....	2.00 @ 2.15
Fairmont slack (ordinary).....	1.70 @ 1.80

#### BALTIMORE

**Export situation improving. Domestic demand light. Anthracite receipts small; some dealers paying premiums.**

While the domestic business is light here the export situation continues to show fine improvement and this trading is the bright spot in the local situation. There were plenty of queries and many chasings for business into quarters that appeared bright, but which did not bring about results after investigation. Many of the leads that looked tempting and appeared to be ready for closing held off when an attempt was made to pin down the buyers. Spot business continued to be all that was done here, although there were reports that several contracts had been consummated. In the open market \$2.75 was the top price for the best grade of coals, while some of this grade sold down as low as \$2.50. For medium grade fuels the price ranged about \$2.30, with \$2 and as low as \$1.90 for the low grade of fuels. There was very little demand for the cheap grade of fuels.

June appears to be headed for a record in exporting at this port and in 21 days of the month 28 vessels have left this port for European and South American ports carrying 145,245 tons cargo and 13,992 tons bunker. Italy, Switzerland and Holland each had four vessels, and Sweden nine ships. South America ports had six ships, Argentina, three; Brazil, two, and Peru one. Cuba was the destination of one ship. Indications are that the last week of the month will also show heavy shipments.

Anthracite dealers are still worrying along with light receipts and no prospects of obtaining any larger amount of coals unless they pay heavy premiums. Several dealers, however, took advantage of figures quoted by independent operators and paid premiums over what they have been paying and thus were able to get about a dozen carloads of coal. Announcement is expected before the close of the month of an increase to householders, 25c. or more per ton, over the April schedule, which is still in force. There is likelihood of a meeting of the Baltimore Coal Exchange this week.

#### Lake Markets

##### PITTSBURGH

**Some higher circular prices quoted. Heavy lake shipments. Prompt coal steadier.**

Some Pittsburgh district operators have advanced circular prices, making mine-run \$2.50 instead of \$2.35, 3-in. \$2.75 and 13-in. \$2.90, but as they had already stopped selling for the remainder of the coal year at the old prices this is largely an incident. Nearly all the contracting that could be expected had already been done, all producers being disposed to limit their commitments on account of operating uncertainties and feeling that consumers should be content to buy their remaining coal from month to month, paying whatever the situation might warrant. No regular contract market is quotable.

Lake shipments continue heavy. The last Geological Survey report shows dumpings at lake ports, including vessel fuel, at 6,117,063 tons thus far in the season, against 4,966,868 tons in the same period last year. This Pittsburgh district has contributed its full quota to the increase. It is probable that the movement will taper off earlier than usual and this seems necessary as the railroads, in their present condition, could hardly stand up under the rush that usually occurs toward the end of the season.

Prompt coal is somewhat stiffer, there being less coal than formerly available at minimum prices while on the other hand the full \$2.35 price on mine-run is more frequently obtained. Only Panhandle coal could probably be picked up at \$2, and if this price has been done on Connelville it was altogether exceptional. For prompt shipment we continue to quote: Best

grades gas coal: Mine-run, \$2.35; slack, \$1.65@1.85; screened, \$2.60@2.70; Steam: Slack, \$1.40@1.70; mine-run, \$2@2.35, per net ton at mine, Pittsburgh district.

#### BUFFALO

**Some report of bituminous improvement. Many jobbers fail to see any. All agree that it is not far off. Anthracite going fast again by lake. Stove size scarce.**

**Bituminous**—The sellers of soft coal do not yet agree as to the condition of the trade. Some find the demand increasing, some do not. It is conceded, though, that the consumer is now eager to make contracts, and that means he is convinced that the prices have reached the bottom; so the seller is inclined to hold off. Why sell coal at going prices on long delivery when the only change possible is an advance? The reasoning is good and it is likely to be acted on. While it is easier to handle the bulk of the coal on contract than by single orders, it would not be safe to sell it for less than it costs.

The word from the mines is all one of confidence. The future stands for a good trade at good prices. Everybody is saying that. Some jobbers are wondering how much of this prediction is born of a wish to that effect, but they agree that a confident feeling is proper and say nothing against it. Trade must come back before long, and the moment it sets in the big sale of coal will begin. At the same time it will do no good to attempt forcing the market, so the shipper waits for it to move of its own accord, believing that he will not have to wait long.

Shippers are careful not to forestall the advance by crowding coal forward. Buffalo has little or no coal on track unsold, and the plan seems to be general not to pretend an improvement is here till it comes. At the same time the reasons for a better trade are quite out of the coal trade proper and it will have to wait for them. The waiting time has been long and should be close to the end.

Bituminous prices are stronger, but have not changed much of late, the basis being \$4.55 for thin-vein Allegheny Valley, \$4.45 for Pittsburgh and No. 8 lump, \$4.30 for same three-quarter, \$4.05 for mine run, \$3.65 for all slack, per net ton, f.o.b. Buffalo.

**Anthracite**—The demand is still in excess of the supply, but is not very insistent. Shippers hope that by the return of cool weather they can meet it again, in spite of the shortage in mining. It is expected that July will turn out more than June has. The stove size is especially short and it will continue so till the fall demand for chestnut sets in.

The shipments to the lakes are heavier than they were, being for the week 133,647 net tons, of which 49,600 tons cleared for Duluth and Superior; 34,800 tons for Chicago; 31,700 tons for Milwaukee; 3,700 tons for Green Bay; 3,500 tons for Sault, Can.; 3,486 tons for Ashland; 3,300 tons for Manitowoc, 1,611 tons for Sheboygan; 1,000 tons for Racine and 950 tons for Hancock.

Freight rates remain at 60c. to Chicago, 57½c. to Racine, 50c. to the Sault, 47½c. to Milwaukee, 42c. to Duluth, Green Bay, Hancock, Manitowoc and Sheboygan.

#### CLEVELAND

**Ohio coal operators are feeling the effects of a car shortage. Combined with labor shortage, this has kept the mines from being operated at more than 55 to 60 per cent., on an average. Demand for all grades except domestic bituminous continues good.**

**Bituminous**—With the lake trade taking just about all that the mines can forward, and steam-coal consumers showing increased interest in the market, southern and eastern Ohio operators are finding themselves face to face with a serious car shortage. Despite the large surplus of cars reported month by month by the Federal Railroad Administration, the supplies at Ohio mines the last ten days have been quite restricted. It is believed so many cars have been kept in service beyond normal length that excluding all cars badly in need of repairs, the administration has not near the number that will be needed the coming winter.

All this is taken by operators to make it doubly advisable for coal consumers to stock now. A goodly number are buying, but a surprising number still scoff at talk of a shortage. Meanwhile, every week sees prices stiffening. Coal may be said to be plentiful in that all needs are being met, but the southern and eastern Ohio mines now are not producing much more



coal, if any, than is actually being used. Thus no opportunity for stocking exists, and if the larger steam-coal users start into next winter with no more stocks than they have now or show signs of laying in, operators cannot see anything but a serious pinch.

The labor trouble at the mines continues, but for the present it is overshadowed by the car shortage. While some operators are inclined to contract freely and take what they call a safe and fair profit, many others are leaning toward the side of doing as little contracting as possible. The only difference among operators is on how high coal will advance next winter. It is reported that a fair-sized block of slack has been contracted for at \$2.10, while another user has taken mine-run at \$2.20. This last deal is supposed to involve quite a sizable tonnage.

Plenty of anthracite and Pocahontas is being laid in, but the larger domestic users of bituminous, such as apartment houses, hospitals and the like, are averse to buying now. They say last winter's experience with the "stock early" advice was disastrous, and they are quite gun-shy at present. Supplies of anthracite and Pocahontas are increasingly difficult to obtain.

**Lake Trade**—Car shortage at the mines has slowed up the movement toward the lakes, but despite this the supply on hand at Lake Erie ports is somewhat larger. Increase in the number of consignments this season is the explanation. Efforts are being made to release the cars now being held at lake ports. Barring this temporary condition, the lake trade may be said to be taking all the bituminous it can get. So far this season shipments are about 30 per cent. ahead of a year ago this time.

Prices of coal per net ton delivered in Cleveland are:

<b>Anthracite:</b>	
Egg.....	\$10.85 to 11.05
Chestnut.....	11.15 to 11.35
Grate.....	11.05
Stove.....	11.05 to 11.25
<b>Pocahontas:</b>	
Forked.....	9.00
Lump.....	8.25
Mine-run.....	7.20
<b>Domestic bituminous:</b>	
West Virginia splint.....	7.75 to 8.00
No. 8 Pittsburgh.....	6.10 to 6.35
Massillon lump.....	7.30 to 7.40
<b>Steam coal:</b>	
No. 6 slack.....	4.20 to 4.40
No. 8 slack.....	4.70 to 4.95
Youghioheny slack.....	4.85 to 5.15
No. 8 1-in. lump.....	5.40 to 5.55
No. 6 mine-run.....	4.40 to 4.50
No. 8 mine-run.....	4.80 to 4.95

#### DETROIT

Bituminous coal buyers are pursuing a waiting policy and shipments are light, with prices rather steady.

**Bituminous**—Efforts of wholesalers and jobbers have so far failed to impress Detroit consumers of steam coal with the advisability of placing orders promptly to assure obtaining an adequate supply. Many of the buyers are withholding orders and some are buying on a hand-to-mouth basis, evidently desiring to be in position to take advantage of any lowering of prices that may occur.

The jobbers are holding out no encouragement that coal will be cheaper. They insist that price revisions are more likely to be upward than downward, due to labor conditions and curtailed production, and express surprise that large employers of labor here seem unable to appreciate that the mines are as greatly handicapped in getting men as are other lines of industry.

Shipments are not of large volume at present. Reports are coming to the jobbers, however, that seem to indicate the matter of car supply is soon likely to assume a troublesome aspect. Certain types of car desired by some Detroit buyers to facilitate unloading are said to be almost unobtainable.

With the reduction of the amount of coal on tracks, prices are taking a steadier appearance. Hocking domestic lump is quoted at \$2.75, net ton, f.o.b. mines, with freight and Government tax added for delivery in Detroit. Mine-run from the same district is \$2 and slack \$1.50, while other leading varieties of Ohio coal used in Detroit carry about the same quotations.

West Virginia gas or splint lump is quoted \$3 to \$3.25, while two-inch lump is offered at \$2.85, mine-run at \$2.10 to \$2.15, and slack at about \$1.75.

**Anthracite**—With shipments of anthracite of small size retailers seem well supplied

for present requirements, while household consumers are postponing buying to assure provision for winter requirements.

**Lake Trade**—Because of slow distribution from docks at the head of the lakes shipments are likely to be curtailed soon by lack of storage space. For the week ending June 21 vessels loaded 1,037,499 tons, of which 993,602 tons were cargo coal. Adjustment of labor troubles at the Canadian head of the lakes permits resumption of shipments there, which in part have been diverted to other ports.

#### COLUMBUS

The coal trade in Ohio is running along steadily with production at about 70 per cent. of normal. There is a better demand for domestic grades. Steam business is quiet while lake trade is becoming fairly active.

The best feature of the Ohio coal trade is the better demand for domestic grades. This is especially noticeable in the fancy grades where the demand is especially strong. As a result prices for Pocahontas and West Virginia splints are stronger. Pocahontas is selling around \$4.75 to \$5 at the mines while splints are quoted around \$3. Retailers are taking advantage of the time to stock up preparatory to the stocking-up period, which has now about arrived. Householders are showing a disposition to buy although some are holding off for lower prices. Generally speaking, the domestic trade is later than usual in showing activity, and only a small amount of the retail business has been booked.

There is a better demand for steam sizes, although that branch of the trade is not developing so fast as was expected. Steam users are buying off the open market and are showing little disposition to contract. This is especially true of users of screenings, which are still a drag on the market. Iron and steel plants are not buying to any great extent although business in that line is expanding. Reserve stocks are being depleted, which is one of the best signs of the trade. General manufacturing appears to be improving, judging from increased fuel purchases.

The lake trade is showing considerable activity, although the Hocking Valley field is not sharing in the activity to any great extent. Pomeroy Bend is benefiting, and the same is true of eastern Ohio. Practically all of the lake fuel agreements have been made and thus those who have not shared in the business will be cut out for the season. Vessels are plentiful and dock interests are rushing a good tonnage to the head of the lakes. No congestion on the upper lake docks is reported as there is a good movement to the interior.

Production is holding up fairly well although little increase is reported during the past week. In the eastern Ohio field the output is estimated at 75 per cent. and the figures from Pomeroy Bend are 70 per cent. The Hocking Valley is producing between 60 and 65 per cent. of normal. Other fields are not showing up any better than formerly.

#### CINCINNATI

Local coal dealers optimistic of future. Smokeless coals hard to obtain.

Local coal users still maintain an indifferent air as regards the forecasted shortage for next winter and continue to refuse to lay in their winter supply. However, dealers and operators both are optimistic and look for a brightening of the conditions in the very near future.

Bituminous coal is selling to consumers in this city at \$6 a ton in the downtown section and \$6.25 a ton on the hilltops. Dealers predict this price will increase and that many of the householders will be disappointed if they wait until late in the summer before placing their orders. Pocahontas is out of the question, there being little in this market. Many domestic users have been waiting to lay in a supply of the smokeless coal, their patience with the soft product during the years of the war having worn out. There are some who were fortunate to get in a supply of smokeless coal early this spring, but local dealers are not promising to supply any more this summer.

The smokeless product is up to \$7.50 a ton delivered, with no prospect of immediate delivery, with the Navy taking almost every lump in sight. Cincinnati retail dealers can get little smokeless coal. The lump coal situation is stiff, few orders being placed by the industrial users; but the market on run-of-mine showed much improvement during the past week.

Car shortages to all mining districts in this vicinity are reported, the shortage along the Louisville & Nashville in Kentucky being most pronounced.

#### BIRMINGHAM

Steam market showing more strength, with indications pointing to steady improvement. Domestic still strong and supply restricted.

A more optimistic spirit is prevalent among the coal men in this market, and there is a general feeling that there will be a steady increase in the demand for steam coal from now on. The delay of the railroads in awarding contracts for fuel for the year beginning July 1 is still somewhat of a disturbing factor. While it is understood that several lines have closed for the tonnage they will take from this district, so far as is known the Frisco is the only line which has signed contracts, taking around 220,000 tons of Walker County coal for the twelve months beginning July 1 at Government prices for the grades taken. The general commercial trade has improved some and some contracts are being closed at Government prices, and slightly better for best grades.

Brokers report a continued strong inquiry for domestic grades, lump being almost unobtainable in the open market. Spot quotations are about as follows per net ton mines:

Cahaba.....	\$4.50@5.00
Carbon Hill.....	3.25@3.50
Big Seam.....	3.60
Climax and Montevallo.....	5.00
Black Creek.....	4.00@4.50
Corona.....	3.75@4.00

Indications point to an increase in coal production in the near future, as several furnaces are being made ready for service and will be placed in blast within the next week or two. Some labor is leaving the district, and there is a disposition on the part of the men to drift from one operation to another owing to the short working schedule.

#### Coke

#### CONNELLSVILLE

Bulk of contract furnace coke business concluded, together with nearly all foundry coke business. Prompt prices stiffen.

Except for some eastern furnaces, the furnaces now in blast have nearly all covered for coke needed in the second half of the year. One eastern furnace interest has closed for a round tonnage, but others are considering byproduct coke made in the east, and may indeed have closed already in that quarter. Several furnaces now idle are negotiating for coke, but operators are shy about taking such contracts as that looks too much like giving an option. The furnaces might stay idle as long as it was hard to sell coke and get into blast only when coke would sell itself. Reports are that two or three furnaces may blow in sooner than they would like to do, merely to enable them to cover on coke for the remainder of the year. Contracts made on this movement probably aggregate between 125,000 and 150,000 tons a month, chiefly on a sliding scale basis, the coke being priced from month to month at 1 to 6¢ against basic pig iron at valley furnaces, whereby with pig iron at \$25.75, as it is now quoted, the coke would be invoiced at \$4.12. Some operators express a preference for holding their coke and selling from month to month, on the theory that they may be able to secure higher prices late in the year even if pig iron does not advance.

Foundry coke is now well under contract for the second half, at \$5 to \$5.50, depending on brand, and also upon the kind of service operators furnished during the war. One coke has sold at a lower relative price than it usually commands by reason of indifferent deliveries made last year.

Spot and prompt coke is stronger. Concessions from \$4 for furnace coke, formerly the rule, are now exceptional if made at all, while a quotation of \$4.25 is common. Foundry coke is not quotable at a higher range, but the tonnage to be picked up at the \$4.50 minimum lately quoted has become very small. We quote spot and prompt furnace coke at \$4@4.25, spot and prompt foundry at \$4.50@5 and foundry on contract for the second half of the year at \$5@5.50, all per net ton at ovens.

**Buffalo**—The market is slightly stronger, as the furnaces increase in activity. Prices have not changed from former quotations, being \$7.25 to \$7.60 for 72-hour Connells-ville foundry, \$6.60 to \$7 for 48-hour furnace and \$6.10 for off grades. The situation slowly improves all around. Iron ore is coming in much more freely, though not

enough yet to give business to the entire fleet. The amount received for the week was 163,380 gross tons. It averaged above 200,000 tons a week last season.

## Middle West

### GENERAL REVIEW

Domestic sizes scarce, while steam sizes are a drag on market. Publicity campaign to warn public of coal shortage.

The coal market shows practically no improvement to speak of. Screenings and steam sizes continue to be a drag, while prepared domestic sizes are in strong demand. The difficulty the operators are encountering in selling screenings hinders the prompt filling of domestic orders, and as a result operators are behind on one grade of coal and are industriously hunting for a market for the other grades. The delay in filling domestic orders is causing the retailer some worry because he realizes that if he cannot get prompt shipments now, conditions during the fall and winter will not be much better.

Operators and distributors alike were hoping that conditions in the coal industry would go back to something near normal this summer. The contrary is the case, however. During an ordinary summer, screenings are at a premium practically from April to July, and prepared sizes for the domestic trade are never in demand until after July. This season conditions have been the reverse, with a strong demand since last March on prepared sizes and no demand to speak of for screenings and steam sizes in general.

Operators are making a strong fight to obtain contracts. Large buyers of coal appear interested in contract prices, but do not care to sign up at this time, preferring, it seems, to purchase what little coal they are buying on the open market. Practically all of the coal operators' associations are keenly alive to the present situation and are doing everything they can in the way of publicity to back their members in stirring up public interest and in getting business. With so much steam coal available it seems hard to realize that there is a shortage of coal today. We are referring to Southern Illinois 3 x 2-in. nut or small egg. All of the large companies are from four to six weeks behind on this size, and the dealers in this territory are beginning to feel worried about their future supply of this particular grade of coal.

It has been said that one of the Franklin County operators is sold up on all sizes for the month of July. Furthermore, prices on prepared sizes for July are quoted by this company at 15c higher than the rest of the county. In other words, this company has sold all of its domestic coal on a basis of \$3.10, and is getting good prices for all other sizes. This company makes a specialty of preparing all its coal, and as a result has no screenings or mine-run to offer. The coal under 2 in. in size is graded into various nut sizes, down to practically dust. These smaller sizes of nut are used by small factories, where the greatest efficiency must be obtained from fuel. The dust is used by cement plants. This coal being of such an excellent quality explains why this company is sold up, while other companies are looking around for more business.

The writer does not believe there will be much change in the market in the next one or two weeks, although there are a number of operators who predict that the signing of peace will bring about a strong demand from the manufacturers.

### CHICAGO

No change in market conditions. Predicted that lump coal will be harder to get.

There has been little change in the coal trade. The demand for steam coals is even less than the demand in the country, although domestic orders from Chicago and suburbs continue to come in to operators and jobbers.

Prices have been advanced, effective July 1 on eastern coals. Anthracite coal has, of course, advanced its usual 10c. per ton, although dealers are showing a willingness to pay a premium of 25c. or more for prompt shipment.

Pocahontas mine-run, moving on contract to the retail trade, continues to come in well, although not fast enough to satisfy the retailer. Pocahontas lump and egg is moving, roughly speaking, from \$4 to \$5 per ton f.o.b. mines. When we say Pocahontas, we are referring to both Pocahontas and New River coal.

The demand for southeastern Kentucky coal increases steadily, as this product has grown more and more in favor because of its excellent preparation. Hazard coal is moving freely at from \$3.50 to \$4 f.o.b. mines, for the block sizes. Harland coal is moving at about the same figures. Hazard coal at the present writing seems to be a little more in demand because it contains less soot, is a harder coal, and will stand rough treatment without losing its preparation.

The domestic coals from Indiana and Illinois are moving freely to Chicago, although the most popular size from either state is the 3 x 2 in. small egg. It is predicted that lump coal will be harder to get when the mines begin to receive orders from the country where lump coal is used for threshing.

Current prices are as follows:

### ILLINOIS

Southern Illinois Franklin, Saline and Williamson Counties	F.o.b. Mines per Ton	Rate to Chicago
Prepared sizes.....	\$2.65@ \$3.10	\$1.55
Mine-run.....	2.20@ 2.50	1.50
Screenings.....	1.90@ 2.30	1.50

Central Illinois Springfield District		
Prepared sizes.....	2.55@ 2.85	1.32
Mine-run.....	2.00 2.45	1.32
Screenings.....	1.85 2.20	1.32

Northern Illinois		
Prepared sizes.....	3.00@ 3.50	1.24
Mine-run.....	3.00	1.24
Screenings.....	2.75	1.24

### INDIANA

Clinton 4th Vein District		
Prepared sizes.....	2.65@ 2.95	1.27
Mine-run.....	2.35	1.27
Screenings.....	2.00@ 2.15	1.27

Knox County 5th Vein		
Prepared sizes.....	2.40@ 3.25	1.37
Mine-run.....	2.20@ 2.35	1.37
Screenings.....	1.70@ 2.10	1.37

### EASTERN COAL

New River and Pocahontas		
Prepared sizes.....	4.50@ 5.00	2.60
Mine-run.....	3.00@ 3.25	2.60

West Virginia Splint		
Prepared sizes.....	2.50@ 2.75	2.60
Mine-run.....	2.00@ 2.45	2.60

Pennsylvania Smokeless		
Prepared sizes.....	3.75@ 4.25	2.60
Mine-run.....	2.75@ 3.00	2.60

Hazard, Ky.		
Prepared sizes.....	3.50@ 4.00	2.45
Mine-run.....	2.65@ 3.15	2.45
Nut, pea and slack.....	1.85@ 2.30	2.45

Harlan, Ky.		
Prepared sizes.....	3.25@ 4.00	2.45
Mine-run.....	2.55@ 3.00	2.45

Cannel.....		
Prepared sizes.....	3.00@ 3.50	2.45
Smithing coal.....	2.75@ 3.25	2.60

### MILWAUKEE

Coal market quiet, with a moderate run of business. Contracts let for coal supplies for city institutions.

Summer quiet prevails in the coal market, but deliveries continue to increase as the season advances. The demand from the interior is only fair, however, and stocks are accumulating in consequence. Coke is moving slowly. The June schedule of prices is upheld, and it is expected that the usual advance of 10c. per ton will materialize on July 1, despite the protest of the Milwaukee Association of Commerce that coal is high enough at present.

The city authorities have just awarded contracts for about 65,000 tons of coal for delivery to various municipal institutions during the coming year, at the following prices: Anthracite stove, \$11.80; egg, \$11.60; nut, \$11.90; buckwheat, \$9.25; semi-bituminous lumps, \$7.25; mine run, \$6.40; bituminous lump, \$5.75 to \$6.25; hand-picked N. U. splint lump, \$7.25; smithy coal, \$8.10. The successful bidders furnish eastern coal. The offers to furnish western bituminous screenings ranged from \$4.77 to \$5.11. The city contract aggregates \$342,017.95, a saving of about \$50,000 on last year's coal bill. The authorities of Milwaukee County awarded a contract for 1,500 tons of Indiana screenings for use at the courthouse at \$5.47 per ton. Up to date 231,896 tons of anthracite and 1,047,869 tons of bituminous coal have been landed on the docks at Milwaukee, against 157,389 tons of the former and 749,785

tons of the latter during the same period last year.

The Callaway Fuel Co., which has been operating a hoist of obsolete character, is installing an improved steel bridge to increase the unloading facilities of the yard.

### ST. LOUIS

Local conditions show some improvement, with indications of general betterment. Domestic business is picking up, but steam sizes are heavy and producing conditions hard to contend with.

The local situation shows a rapidly changing condition. Within the past week or ten days the retail situation has shown a marked improvement in the ordering of storage coal. This, however, is chiefly on the better grades of coal such as anthracite, smokeless, Carterville coal and coke. Standard and Mt. Olive is not in demand at all.

The country demand seems to be picking up a little on domestic sizes, but on steam coals the situation remains unchanged and, if anything, begins to grow worse. This is on account of the increased tonnage of domestic sizes being produced, making a greater tonnage of steam sizes for which there is no market. All the available equipment and storage room at the mines and the vicinity thereof is loaded with steam sizes and many mines still continue to dump these sizes on the ground.

The industrial depression in the St. Louis district is unusually severe. It is far-reaching in many ways least expected. An electric power plant that used to consume two or three cars a day seems to be able to get along on one car of screenings now, and many of the smaller plants in the St. Louis manufacturing district have been and are being equipped with electric power. In some sections there has been an offset on the decreased demand for the smaller sizes by the fact that some railroads have locomotive equipment that calls for stoker-size coal, but this does not help the situation to any great extent.

In the Standard field there is an overproduction of everything, chiefly of steam sizes. Some mines have been idle for many weeks. Others having been working one and two days a week and coal is selling below cost. The railroad tonnage is light.

In the Mt. Olive field the situation shows considerable improvement, but most of this coal moves to outside markets, whereas Standard is confined chiefly to St. Louis. The railroad tonnage in the Mt. Olive field is fairly good.

In the Williamson and Franklin County field the steam sizes are the stumbling block. Many mines are still idle in this field and many are working only one and two days a week because they cannot move steam coal. Others are piling it up on the ground.

The miners still continue to leave all the fields for other employment and the foreigners are arranging to go to Europe. The tonnage in nearly all the mines shows a decrease on this account.

Cars at the present time are plentiful, and the movement is fairly good. The railroad tonnage from the Carterville field is good, everything considered.

Conditions in the Du Quoin field are similar to those in the Carterville field with the exception that the prices are not maintained.

Effective the first of the month the Carterville field operators in nearly every instance advanced their price from \$2.85 to \$2.95 at the mine, with the exception of one Franklin County operator who is asking \$3.10 on account of having more domestic orders than he can take care of. The independent operators are getting from \$2.55 to \$2.70.

The prevailing circular is per net ton f. o. b. mine:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
Association:			
Lump, egg and nut.....	\$2.95	.....	.....
Washed Nos. 1 and 2 nut.....	2.95	.....	.....
Independent:			
Lump, egg and nut.....	2.70	\$2.55 Egg	1.75
Washed Nos. 1 and 2 nut.....	2.95	.....	.....
Mine-run.....	2.45	2.20	1.60@1.70
Screenings.....	2.20	2.05	1.35@1.50
3-in. lump.....	.....	2.30	.....
2-in. lump.....	.....	.....	1.75
2x6 egg.....	.....	.....	1.75 & up
Williamson-Franklin County rate to St. Louis	\$1.07	.....	.....
Other rates, \$0.92	.....	.....	.....